RMIT UNIVERSITY

Instability and Landscape

A project submitted in fulfilment of the requirements for the degree of Doctor of Philosophy.

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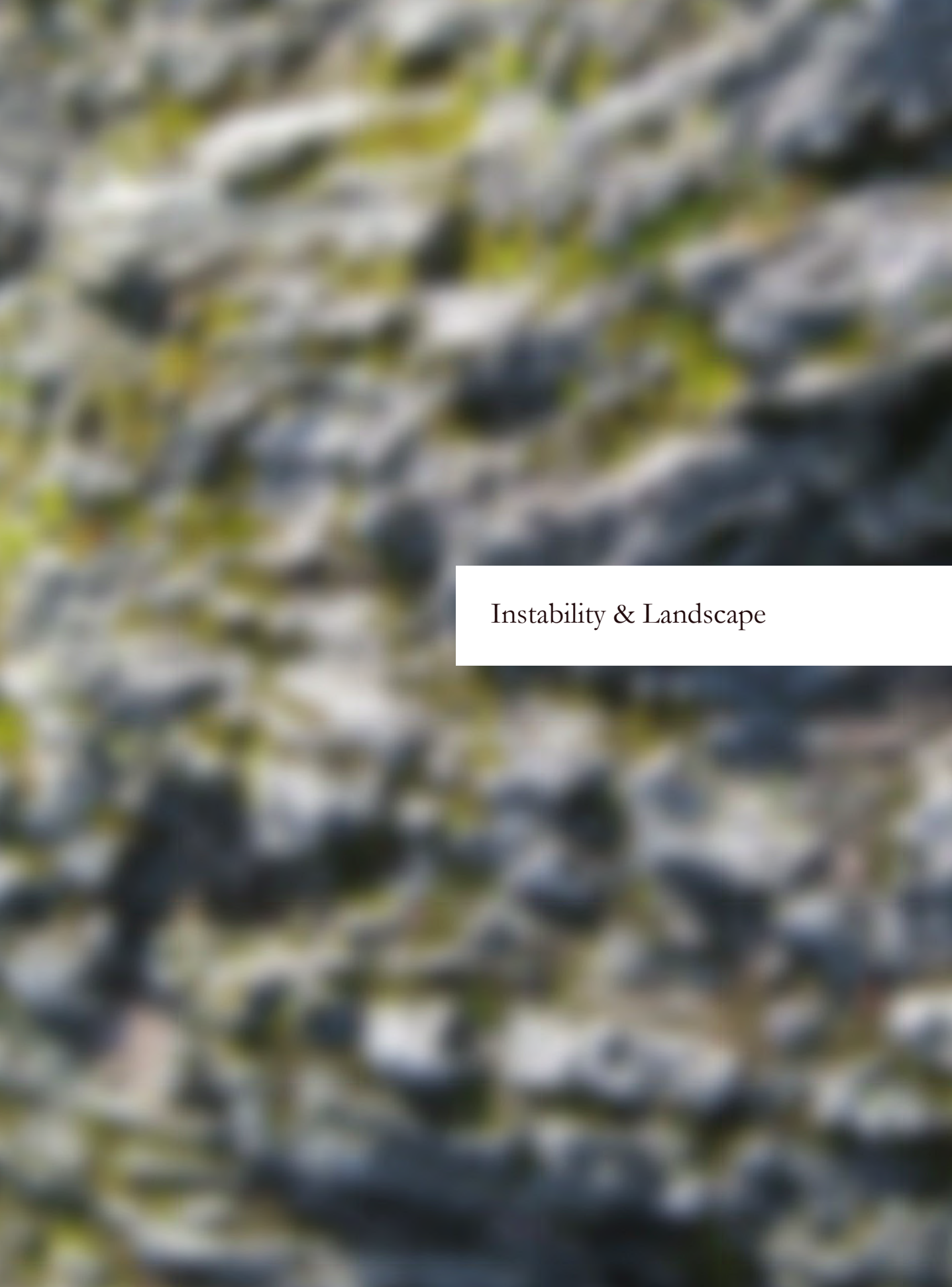
Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

Bridget Ursula Keane

January 22nd 2016



Instability & Landscape

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Name: Bridget Keane

Date: 22 January 2016

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Figure I. Terrestrial scan of Transformative Surface project, by Afflick, G et al. 2008

1.0 Abstract

Abstract

Landscape architecture as a discipline has multiple origins. With lineages from diverse fields of knowledge such as gardening, the sciences, planning, environmental management, landscape painting and architecture. Each of these fields of influence has distinct approaches to looking at (mediating) and acting upon (modifying) the landscape.

Various devices from these fields - instruments, models and mechanisms - are widely used in Landscape Architectural practice to establish the landscape prior to design. Often the devices are applied without modification, assumed to be inert and seen as distinct from the design process.

Given this, to date, little attention has been paid to the agency of the device. This research asks: could we reclaim a critical, creative approach to the devices that construct landscape? Proposing a reorientation of these lenses to allow the construction of landscape as a formative act in the design process. Through the recalibration and modification of a series of devices, this research generates techniques for producing multiple variations of landscape and subsequent design outcomes. Drawing in the influences of other disciplines in ways that are transformative rather than applied.

Three devices begin to unfold a series of design approaches. *The microscope* recalibrates scale and produces variation. *The petri dish* acts as a container for growth - constraining and governing formation. *The grid* discerns, measures, adapts and allows for an integration of formative and material pressures.

The relation between the device and its agency in the landscape revealed the notion of instability. Instability describes the gap between the acts of looking and acting as a productive force making variations between device and matter. Together the laboratories and the associated devices describe a practice that is, by its nature, multiple. Reflecting that the landscape itself is an inherently variable condition and that Landscape Architecture is a discipline with multiple origins.

The research contributes to the discipline of Landscape Architecture by offering critical rethinking of key devices imported from other disciplines. This rethinking occurs through:

- Generating multiple lenses for landscape
- Identification of three devices for landscape architecture
- Reframing the foundation of the devices
- Modification of the devices to produce new techniques for landscape
- Positing instability as a key to understanding the mediation of landscape through the devices

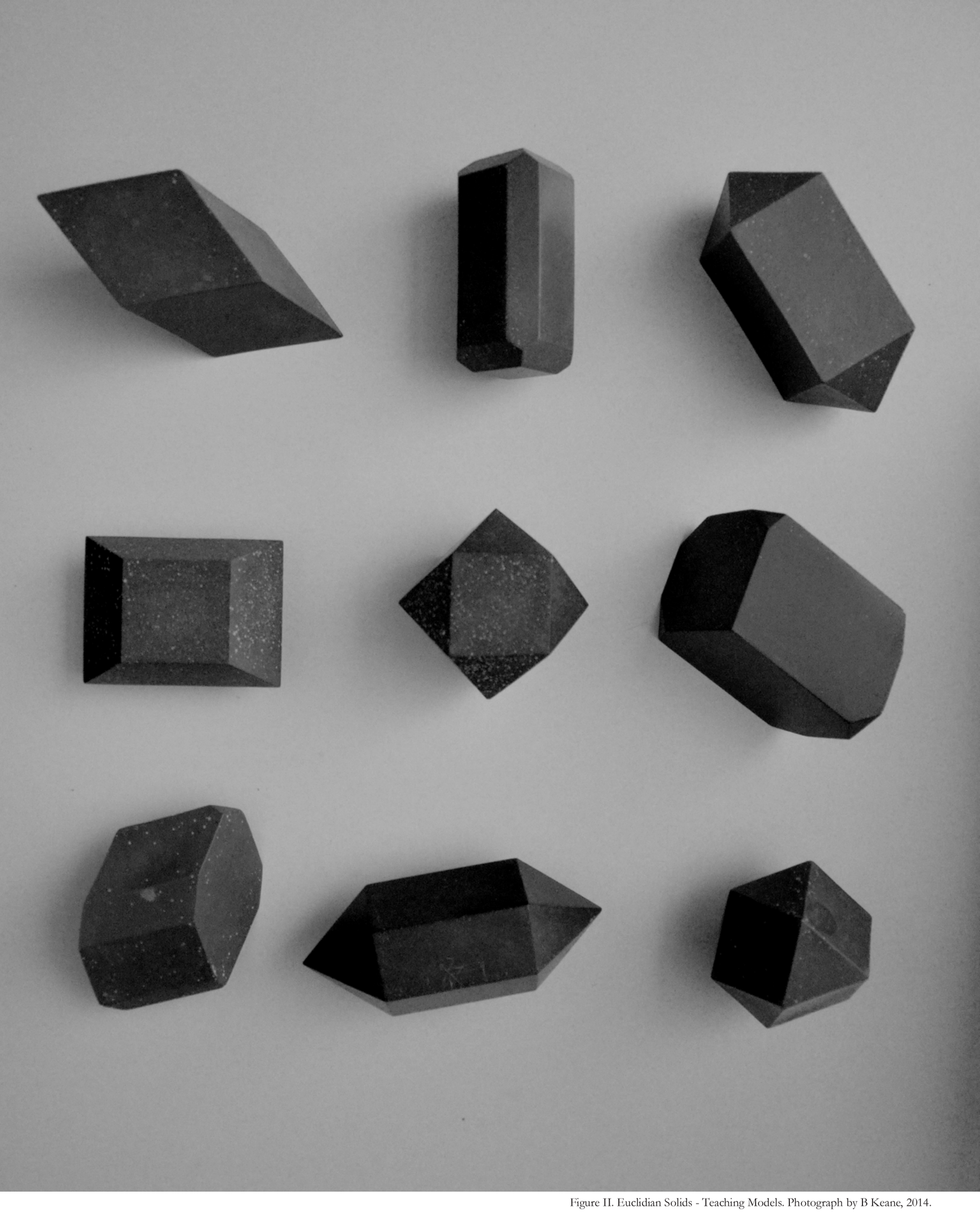


Figure II. Euclidian Solids - Teaching Models. Photograph by B Keane, 2014.

2.0 Preface

2.1 Terms and Elements

The purpose of this preface is to provide an instructional overview of the document. It outlines the key terms and elements of the document. It discusses the various narrative voices and their contributions. It expands on the mode of the laboratory as the primary means for discussing the design works and their relationships. It also briefly discusses the assumptions inherent in using the laboratory as a model.

Key Terms

Laboratory
The Laboratory is a way of describing the 'site' of each the projects. The laboratory as a concept is used as a means to describe the context of the devices. The Laboratories outline a particular set of ideas and associated references in relation to the projects and the larger discourse of landscape architecture. Further elaboration on the notion of the Laboratory is found in section '2.2 Laboratories'

Device
The 'Device' is the instrument used to construct landscape. The device mediates the matter and relationships that together form environment. Abstracting these conditions into 'landscape'. Also refer to section '3.2 Devices'

Matter
Matter describes an undifferentiated, extensive condition. Transformations of matter occur through movement. Refer to section '3.3 Matter'

Instability
Instability is a way to describe the nature of transitions of matter as well as slippages and changes that occur as a result of the devices: it is both an observable physical condition and also a means to conceptualising the effects of ways of looking. Also refer to section '3.4 Instability'

Myth
Myth describes the action of taking scientific forms such as the laboratory and the device and reworking as a creative narrative structures. The laboratory and the device operate as narrative structures that cohere the work and allow for larger themes to emerge.

Material
Material is a formation of matter that is recognisable as a particular type. For example water, ground and vegetation are types of materials. These types have different performances.

Performance
As variations of form are produced through instability between the device and matter, performance is a way to describe the behavior of these forms within the larger environment.

Landscape
The term Landscape describes the mediated condition of the environment. A condition that is produced through the device.

Environment
Environment is the set of relations that occur between materials, forms and entities.

Ecology
Ecology describes the way in which the materials, forms and entities interact.

Abstraction
Abstraction occurs through the act of using the device to mediate the environment.

Elements of the Document
Fictive account: a narrative description of the laboratory and the device it houses

Lab report: describes the actions taken in each of the works and discusses the findings in context of a specific community of practice

Discussion: outcomes in relation to a historical lineage in the discipline

Conclusions: this section coheres and reflects on the outcomes of the research and the techniques developed in the three laboratories

2.2 Laboratories

The research is described through a series of three laboratories. Commonly understood in the sciences as a physical location of research, one that contains devices of analysis and is informed by a research agenda and trajectory. In this research the laboratory is adapted to describe a mode of design practice. The laboratories introduce the reformulated devices, describe and situate the production of the design works. The appropriation of the laboratory as the structure of the PhD uses the same mode of practice, reframing the device to operate at another scale.

Laboratory as structure:
A laboratory is historically understood as a place designed for the production of research. The origins of the laboratory occured as a move from the workspace of the pharmacy to a place purpose built for experimentation[1]. The three laboratories of this research are not physical but a means to describe the structure of the research as a place that houses the devices. Further the work of Aby Warburg informs an understanding of the laboratory - where it is "conceived of as a place where the researcher would not just preserve traces of the past but resuscitate them artificially by means of the collection and the relationship created between text and images" (Michaud, 2004). The laboratory is a structuring of relationships between making and reflecting.

The laboratories are environments, in that they have inputs, relationships and outputs. For the purposes of scope and clarity, this research does not discuss in detail this concept, rather it is a fundamental assumption that allows an elaboration and focus on the devices. The relationship between the devices and the laboratory is that the laboratory coheres a larger set of projects and investigations; the device describes the approach and outcomes.

1 The Matter Factory: A History of the Chemistry Laboratory discusses the origins and transformation of the laboratory over time. Exploring the spatiality of the laboratory. This research uses the spatial metaphor as a means to describe the structure of the research.

The research is grouped into three: the microscope, the petri dish, and the grid. Each one has a focus on a particular means and device for constructing the landscape. Each one links to a larger thematic concern.

Laboratory 01. Device: The microscope / Thematic: projection
Laboratory 02. Device: The petri dish / Thematic: growth
Laboratory 03. Device: The grid / Thematic: amalgamation

The laboratory functions as a type of space, both physical and conceptual:

- Has a larger agenda, but allows multiple experiments within that;
- Allows collaboration to be understood as collaborators bringing particular expertise, or more accurately tendencies – in terms of interests and approaches.
- Is a loose constraint for developing new associations where new inputs are integrated
- Allows for the amalgamation of multiple forms of reference.
- Opens up the possibility for a continuous practice, for new threads of enquiry to generate new associations and sets of experiments.
- Allows for the pursuit of threads of enquiry across academic and design practices.

My role in the laboratory is firstly to set an agenda for action, sometimes broad, but directional. Secondly my role is working within, by producing and combining experiments. This research shows the development of a practice of the multiple. The laboratories serve to cohere lines of enquiry across my practice encompassing, teaching, researching and practicing. Working between these scales of action – to produce variations of form and type of projects.

The three foci of the laboratories in this PhD are by no means exhaustive or comprehensive. They are important as they reflect three sets of concerns that interrelate and continually return in my practice. They have been selected as they represent distinct but complementary concerns, situated at three scales of action which allow different formations of landscape.

Notes on the scientific approach

The notion of laboratory comes from, and forms part of, the larger agenda to inhabit and rework typical scientific devices as related to practices of landscape architecture. This allows a number of perspectives onto the work (from within and without), provides a narrative structure and foregrounds the intention of making productive environments for practice.

However, the use of laboratory in this alternate context necessitates an acknowledgement of the scientific as a mode of producing knowledge. It is necessary to clarify that what is discussed here is not to imply that science lacks creativity, nor that the intent or contribution of this work is to bring scientific methods to Landscape Architecture. Rather, the use of the laboratory is an extension of the reinterpretation of models from science as they relate to Landscape Architecture.

Science has long provided models for understanding the ground (soils, geology & topography), vegetation (botany), water (hydrology) and the relationships between them (ecology). Alongside the development of the models was the formulation of a range of instruments, from surveying equipment to environmental monitoring devices, that serve to transform nature into information.

a place where interplay between the defined method or disciplinary constraint and the context (or open and ultimately uncontrollable environment) within which the work is conducted.

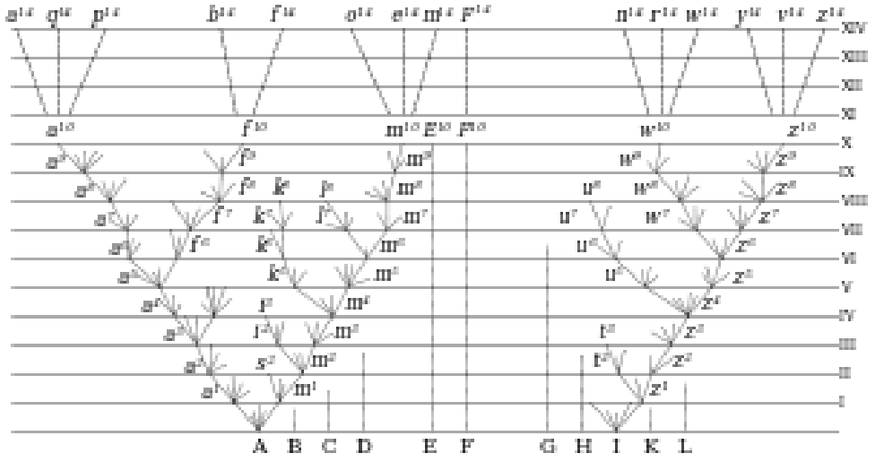


Figure 1. Tree of Life. From *On the Origin of Species by Natural Selection*, by C. Darwin, 1859.

These models extended to ways of organising and theorising information. For example, whilst contemporary scientists agree that Darwin's Tree of Life is too simplistic a model for understanding the complexity of evolution, there is agreement that it serves as a useful example. As a way to consider living organisms, the tree of life organises information, indicates information that is yet to be found, and limits the way the information is understood. By identifying species and articulating their relationships to one another, it provided a means for describing the development of species, their variations and groupings. It has clearly defined limits – the branching occurs linearly and in an orderly fashion. Its contribution to a framing of evolution has been longstanding. Even now criticisms focus on modifications (conceptualising modes of horizontal transfer) rather than a complete overhaul.

Darwin's model gave a hint to the possible role of laboratory – a place where interplay between the defined method or disciplinary constraint and the context (or open and ultimately uncontrollable environment) within which the work is conducted. This perspective posits that the framework, or set of relations in regards to the construction of a particular type of practice/s, indicates a series of design possibilities. It touches on the heart of a difficulty in articulating practices in landscape architecture that by their very nature are compelled to both engage with and reform the object of their enquiry.

Notes on instability and knowledge

Though not the focus of the research, a key assumption of this work is that the everyday notion of 'the scientific' as something coherent and factual is in itself illusory. According to Feyerabend, science 'also contains ideas, interpretations of facts, problems created by conflicting interpretations, mistakes and so on. On closer analysis we even find that science knows no "bare facts" at all but that the "facts" that enter our knowledge are already viewed in a certain way and therefore, essentially ideational' (Feyerabend, 1975, p119).

However, this work is more interested in the role of what Feyerabend terms violations, 'the realisation that events and developments, such as the invention of atomism in antiquity, the Copernican Revolution, the rise of modern atomism (kinetic theory; dispersion theory; stereochemistry; quantum theory), the gradual emergence of the wave theory of light, occurred only because some thinkers either decided not to be bound by certain "obvious" methodological rules, or because they unwittingly broke them' (Feyerabend, 1975, p14). In this conception, the introduction of elements that appear antithetical to the mode of production, for example mistakes or incorrect correlations, could result in the evolution of ideas. In this research the notion of violation is analogous to the role of instability.

In this sense, facts are made through the multiple frames or branches of 'the scientific'. At best 'the scientific' is a means to describe a series of complementary languages. Despite consistent and ongoing efforts to produce an overarching framework, there is no unifying view; rather there is a series of developed articulations with subsequent types of instrumentation that allowed the development of models of understanding. It is also clear that these models of understanding are intimately tied to our modes of perceiving the world. The predominant limit that is underlying and unvarying is of perception and, by extension, interpretation.

Despite this disclaimer, the scientific is considered in this work as productive not limiting. Its value lies in the incredible productivity of the models of thought – both in terms of industrialised products, and as forms of generative constraint for the production of more models. It is itself a demonstration of instability. The scientific provokes the formation of laboratories as heuristic devices that simultaneously constrain and inform the development of generative models of thought which continuously produce types, methods and forms.

2.3 Narrative Structure

The form of the document is structured through the framework of the laboratory. It adapts the outputs of a laboratory the experiments, reports and discussions. It is an extension of the practice, to adapting and modifying techniques from the sciences to discuss a landscape architectural practice. The narrative structure uses various voices to articulate the laboratory. The narrative shifts between a fictive account of the laboratory, a descriptive outlining of the processes of the projects in the Lab Report, and then to an essay form, the Discussion, that situates the projects in a larger disciplinary context. The aim of these parallel narratives is to reflect different perspectives.

The *fictive account* sets up a context. It describes the spatial environment, where the reader could conceivably enter a place in which they would come across the lab report and essay. Here you will find collaborators, references and spaces.

Read the *lab report* to discover the specific devices, processes, successes, failures and outcomes in a series of projects. The report outlines the project within the lineage of my own works. The 'lab report' is the primary structure for discussing the works. This model was used for a number of reasons: by adapting a form normally used for scientific findings it enabled play on ideas of environment, experimentation and methodology.

Move to the *Discussion* to refer to a larger disciplinary context within which the projects are situated. This is where disciplinary relevance is articulated.

Refer to the image sets to see the associative relationships that are created between the various references and project works. The image sets begin to set the foundation for expansion in the exhibition.

Figure 2. Mnenosyme Atlas, Warburg, 1924-1929. Retrieved September 7, 2014, from http://warburg.library.cornell.edu/

2.4 Exhibition

Devices in Action

The larger aim of this body of work has been to generate various constructions of site that integrate matter and the devices of notation, growth and framing that are commonly used to examine it. The devices are instruments of analysis – in this research – the microscope, the petri dish and the grid. As a result the manifestations of the research – the document and the exhibition – reflect these concerns through creating transitions between the devices and the design works.

The exhibition is complementary to the document, formed as a series of three tables, each one corresponding to a laboratory. Each table illustrates the use of a landscape 'device' and its relation to the discipline. The three devices of the microscope, the petri dish and the grid form the groupings of the projects and subprojects. The projects can be read in relation to the device.

Associations are also formed between and across the three laboratories through scale, type and outcome. They are informed by Aby Warburg's *Mnemnosyne Atlas (1924-1929)* and André Malraux's *Le Musée imaginaire (1952-1954)*. The mode of association was chosen as a means to generate multiple narratives and perspectives through the deployment of the device. In this way the images serve as complementary to the text, allowing other relationships such as resemblances, taxonomies, materialities and conflicts to emerge.

1 Warburg was an art historian who generated an alternate art history through the notion of the gesture. To do so he set up a series of image sets in his Mnemnosyne Atlas that served as a plane on which to examine at the works. Warburg referenced across genres, mediums and used ideas from dance to consider the development of ideas that was focused on transition and movement rather than chronology.

2 Malraux, an art historian created the 'museum without walls' by assembling, reassembling and photographs – implying the act of curation was primary in the construction of art history.

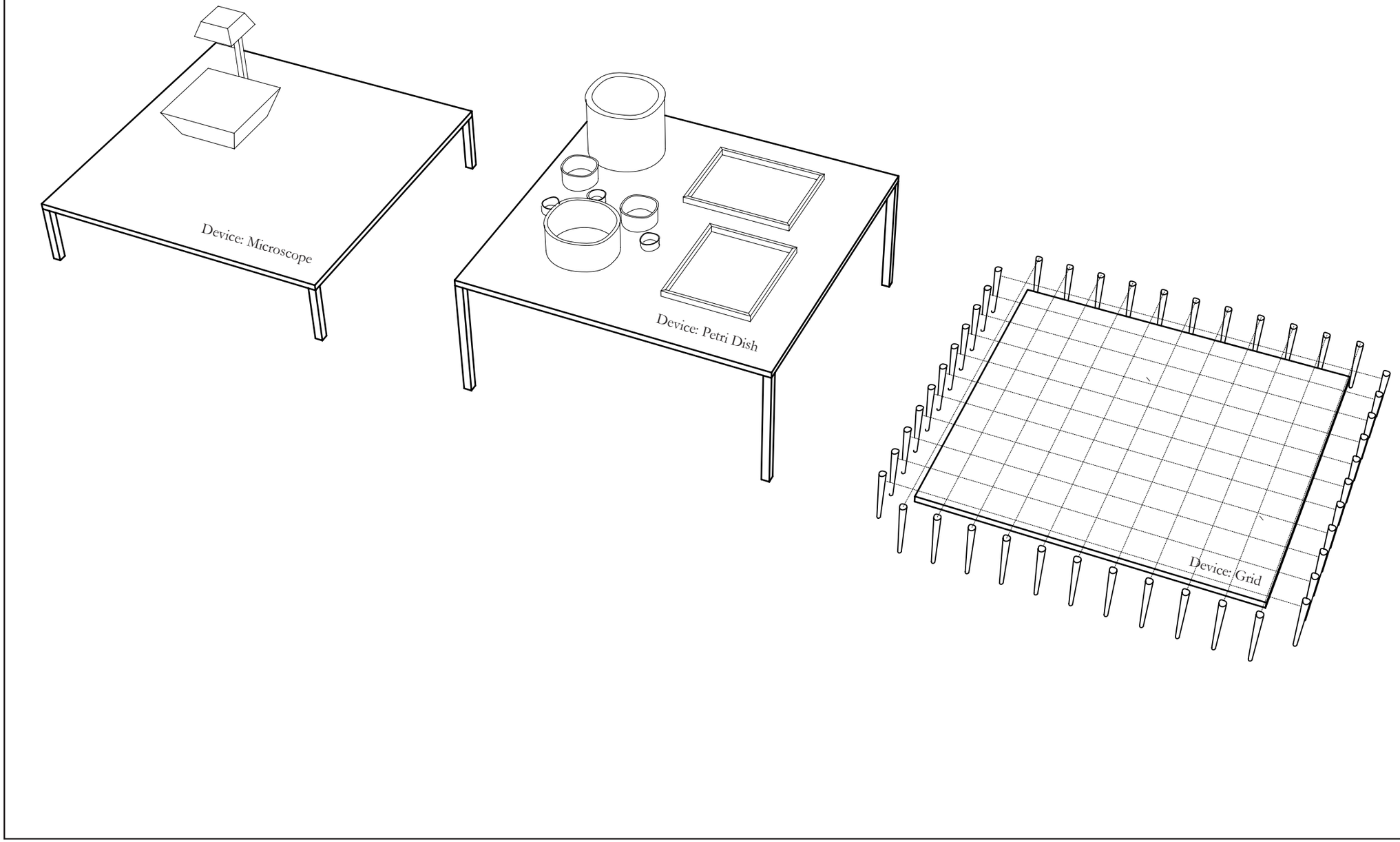


Figure 3. Exhibition Layout - Devices. Keane, B. 2015.

Figure III. Slag heaps - South Australia. Keane, B. 2012.

3.0 Introduction

3.1 Overview

This introduction takes the form of an extended glossary. Its aim is to elaborate and connect the key terms and influences of the research.

The first part of this section introduces the devices. The devices are instruments for looking at the landscape. Contained within each laboratory is a specific complementary device. As instruments that construct the landscape the devices are the primary point of formation in the projects. The action of each device will be briefly outlined.

The second part expands the key concepts that emerged as a result of the devices in the research – matter, instability and amalgamation. It argues that a reciprocal relationship between the device and matter can be described through instability. A condition of amalgamation occurs when the device and landscape work in concert transitioning matter. The concepts are elaborated through a reflection on a number of concerns and influences on the practice.

The third part discusses how the research is related through the device to the community of practice. Outlining the influence of existing practices on the development of an approach to the device.

The fourth part outlines the outcomes that were developed as a result of undertaking the research.

"that's my basic problem, really. I can't erect a decent barrier between subject and object" (Murakami, 2014).

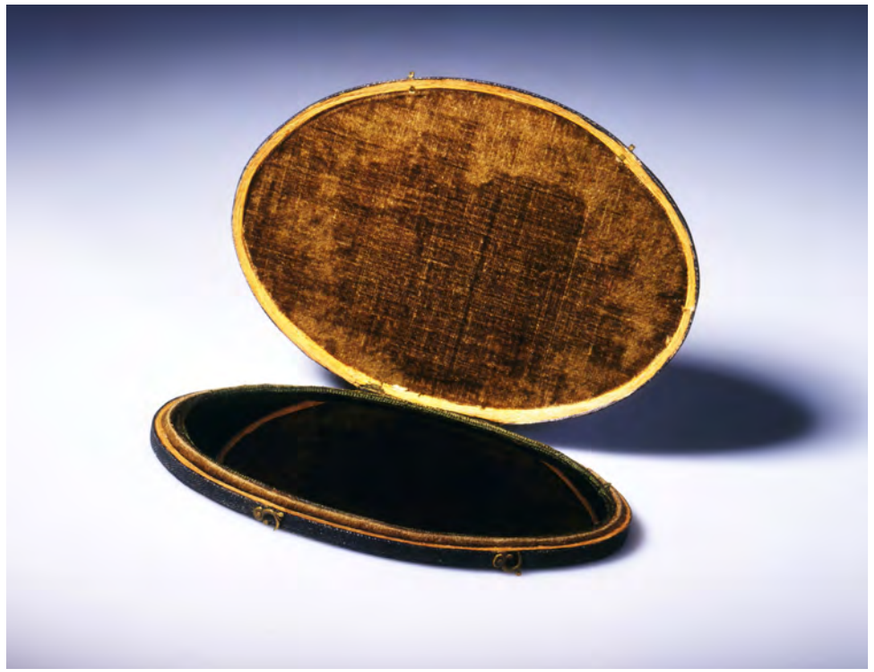


Figure 4. Claude Glass, 1775-1780. Retrieved August 2, 2015, from http://collections.vam.ac.uk/. Copyright Victoria and Albert Museum.

Historically, Landscape Architecture has used conceptions of both the artistic (for example, the picturesque) and the scientific (for example, botanical and ecological models) as a means to bring forth *landscape*, to construct it. The device that mediates the environment and those who act within it link the two, from the Claude glass used by picturesque painters to GIS and terrestrial analysis tools, each adds to landscape architect's suite of instruments for site analysis. These models and objects act as a mechanism to incorporate nature into the realm of human concerns and operations of their time – in short, as devices to produce *landscape*.

The Device

The devices in this research are not considered as objects. They perform dual overlapping functions at two scales. On the one had they act as means to focus on and elaborate specific ideas through each laboratory. As active agents they are operational in constructing the landscape, but at the same time serve to situate it within a larger context. In this way the devices refract and reflect the multiple - showing that even in the basic act of seeing - "there is never a pure access to a single object; vision is always multiple, adjacent to and overlapping with other objects, desires, and vectors." (Crary, 1990)

Furthering this idea of the multiplicity of vision, the device becomes a way to understand a series of relationships around the act of looking. The device sits at the nexus of designer, environment, site and design project. The location and lineage of the device draws in sets of ideas and constraints. An acknowledgement that the device is "embedded in a much larger and denser organisation of knowledge and of the observing subject" (Crary, 1990) allows for the structuring of the research to creatively mine the intersections that the device creates. Similarly, Agamben describes the notion of the apparatus as "a set of strategies of the relations of forces supporting, and supported by, certain types of knowledge." (Agamben,

2009). The devices allow for an accounting of design practice that acknowledges and embraces the multiplicity inherent in design - the amalgamation of practical, the fictional, the philosopical, the artistic and the scientific. Together these ideas begin to articulate the value of the device as both a mechanism for looking and a means to consider types of knowledge that emerge through its use. As "a site at which a discursive formation intersects with material practices." (Crary, 1990)

The Device and Landscape Architecture:

The use of the term 'device' in landscape architecture to date has not been discussed in any depth. Historically, there has been a focus on acts of representation rather than on the instruments used to create these representations. This has led to a emphasis on the type of outputs of the processes of looking. Neglecting the instruments that this occurs through. The devices serve to limit the extents of the project within the extensive condition of the landscape. To reconsider the boundary of site through the limits of the device.

However, from a broader design perspective, a number of contemporary design projects have investigated the notion of the device. CJ Lim's text 'Devices' refers mainly to the physical construction of devices as a primary design act. Prioritising fascinating and unusual devices. The devices discussed in this text enter the environment with fantastical results. In the work of Smout Allen the landscape and its operation are collapsed together to operate as a single device/machine. Geoff Manaugh's text Future Landscapes outlines the development of specific devices for design. Often borrowed from other disciplines these works are primarily concerned with the production for the architectural object, at times the outcome being a scaled up device itself.

Together these works share a fascination with 'devices', however, they are primarily concerned with the production of the device itself as a object that interacts with the environment. This is in direct contrast to the emphasis of this research - which is an investigation into the position of the operator in relation to the device and the subsquent variations of landscape that are produced. This research asserts that landscape architecture in always mediated through devices and it is not the creation and physical embodiment of these devices that is the outcome but the modification of them through design that creates multiple forms of landscape.

The Operator and the Device:

The role of the operator is in generating the landscape through the modulation of the device in question. The device is not separate from the operator. The body and its restrictions, the mind and intents, are incorporated in its operation. To consider the human as removed from this realm is to deny the device its history and the laboratory its agency as an environment. In this research the role of human processes is considered through the operation, modification and generation of outcomes from the device. There is a continuous connection from the landscape to the device and its operator. The microscope engages the eye. The petri dish the hand. And the grid incorporates the figure of the observer.

Figure 5. Prosperine (persephone), Rosetti, 1874. Retrieved August 2, 2015, from http://www.tate.org.uk/. Copyright Tate London.

Myth

This research seeks to find ways of mediating between ways of looking and ways of acting. The myth of the device creating objectivity and distance from the subject observed is reconsidered. In doing so, it remakes part of the scientific lineage[1] of landscape architecture which has long assumed that devices of looking are inert. In opening up the devices to alternative uses the research by extension offers alternate readings, references and meanings of the landscape. Providing multiple perspectives and manifesations. A continuous myth making.

[1] The scientific lineage of Landscape Architecture here refers to the various facets of scientific enquiry that have been incorporated into practice at various times. For example surveying, biological taxonomies and ecological models.

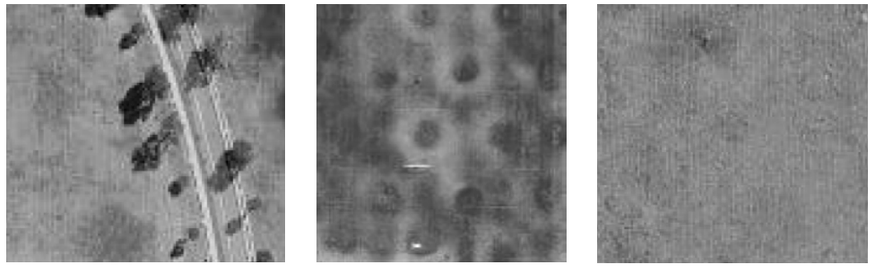
Persephone was playing in a meadow when she was seized by Hades and carried off to the underworld as his bride. Demeter, her mother, was distraught at her disappearance and searched all through the world for her. When she discovered that Persephone was with Hades in the underworld, Demeter denied the earth produce until she was returned. An arrangement was made that Persephone would spend part of the year with her husband and the other part on the earth.

Myths construct narratives that try to makes sense of the transformation and intersection of the physical and metaphysical worlds. The myth of Persephone clearly demonstrates this logic. It is a means for describing the passage of the seasons and their effects: the barrenness that characterises winter and the growth that emerges in spring. Persephone is the link between the worlds and is the 'carrier' of the seasons, enacting change through her movement from the underworld to the surface. The opposing elements of underworld and surface, summer and winter, are reconciled through her progression.

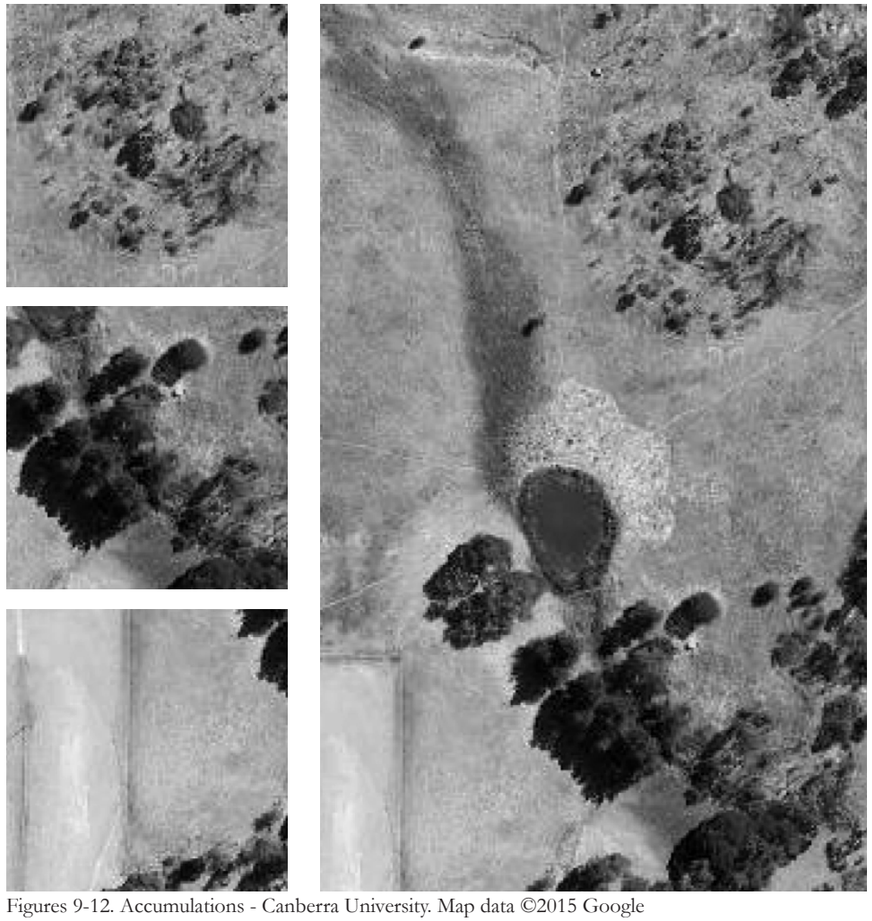
Persephone's movement, like myth more generally, allows an account of transformation in a material and a conceptual sense.

However, the interest of myth to this research is not about viewing the landscape through mythical metaphors or providing a survey of myths that elucidate conditions of landscape. Rather it describes the creative reinterpretation of the laboratory and the devices as a form of myth making. Considering it this way allows for an opening of the conventions to find ways to adapt and reframe the techniques of other disciplines. Myths integrate a larger theme – and also the material processes informing a practice that acts as a curator (of larger systems, ideas and processes) and a maker (of form, and performance) to produce the multiple.

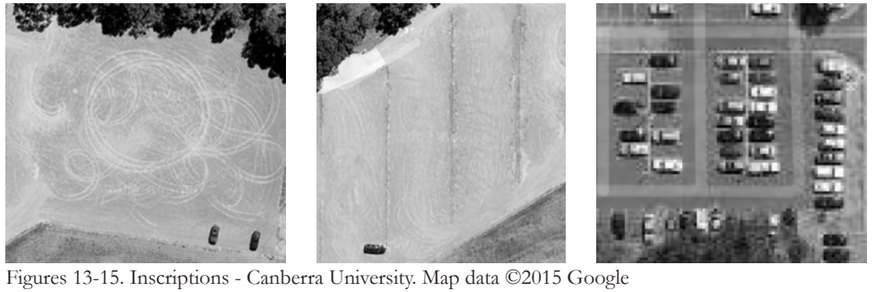
The three devices of constructing landscape generate points of departure for reinterpretation and reconfiguration as design approaches. The plan, the species and the contour are reworked, forming a series of narratives from above (the microscope), within (the petri dish), and from the surface (the grid). The devices sit within the context of the laboratory. They are ways of looking at, and operating on, the landscape. It is important to describe the action of the devices as they describe particular transformations of landscape. Through the mechanism of the device various possibilities and design actions are enabled.



Figures 6-8. Alignments - Canberra University. Map data ©2015 Google



Figures 9-12. Accumulations - Canberra University. Map data ©2015 Google



Figures 13-15. Inscriptions - Canberra University. Map data ©2015 Google

3.2.1
Device: The Microscope

The microscope was first introduced in the seventeenth century[1]. Its use transformed scientific enquiry by enabling a view of the world previously invisible to the naked eye. Under the microscope, patterns orders and logics were revealed. The microscope in this research sits within a laboratory concerned with projection, the plan and types of performance. Relating to a disciplinary lineage of mapping and scaling.

The microscope enables a viewing of the landscape at multiple scales, where each scale indicates different operations and relationships. Magnification reveals that the understanding of site varies depending on the scale of looking. Relationships cannot always be directly scaled up or down, operations may occur differently over scales. For example the operation of the stomata on the surface of a leaf opening and closing for transpiration is distinct from that of the veins that transport of water and sap. Even though the leaf is the same physical entity, processes occur on and through it in multiple ways.

The multiple lenses give moments at scales. The organisation of matter occurs from micro to macro in multiple ways. At either ends of this spectrum, the macro exposes patterns that indicate the relationship between static and dynamic. Between geometry and environment. The micro exposes the looser organisations that occur as a result of actions on the ground – the movement of vehicles, water, people and so on. The microscopic lens distorts the site. The continuous nature of landscape is reduced to the relations observable on the plate under inspection. The landscape is constrained as a projected figure. Instability occurs between the scales that the device is focuses on.The act of focusing the microscopic lens is a means for selecting and prioritising relationships and formations, establishing actions of a shifting of hierarchy in the projects. The microscope produces relationships between projection, geometry and the matter of site.

1 Considine, G. D., & Kulik, P. H. (2002). Van Nostrand's scientific encyclopedia. New York, NY: Wiley-Interscience.

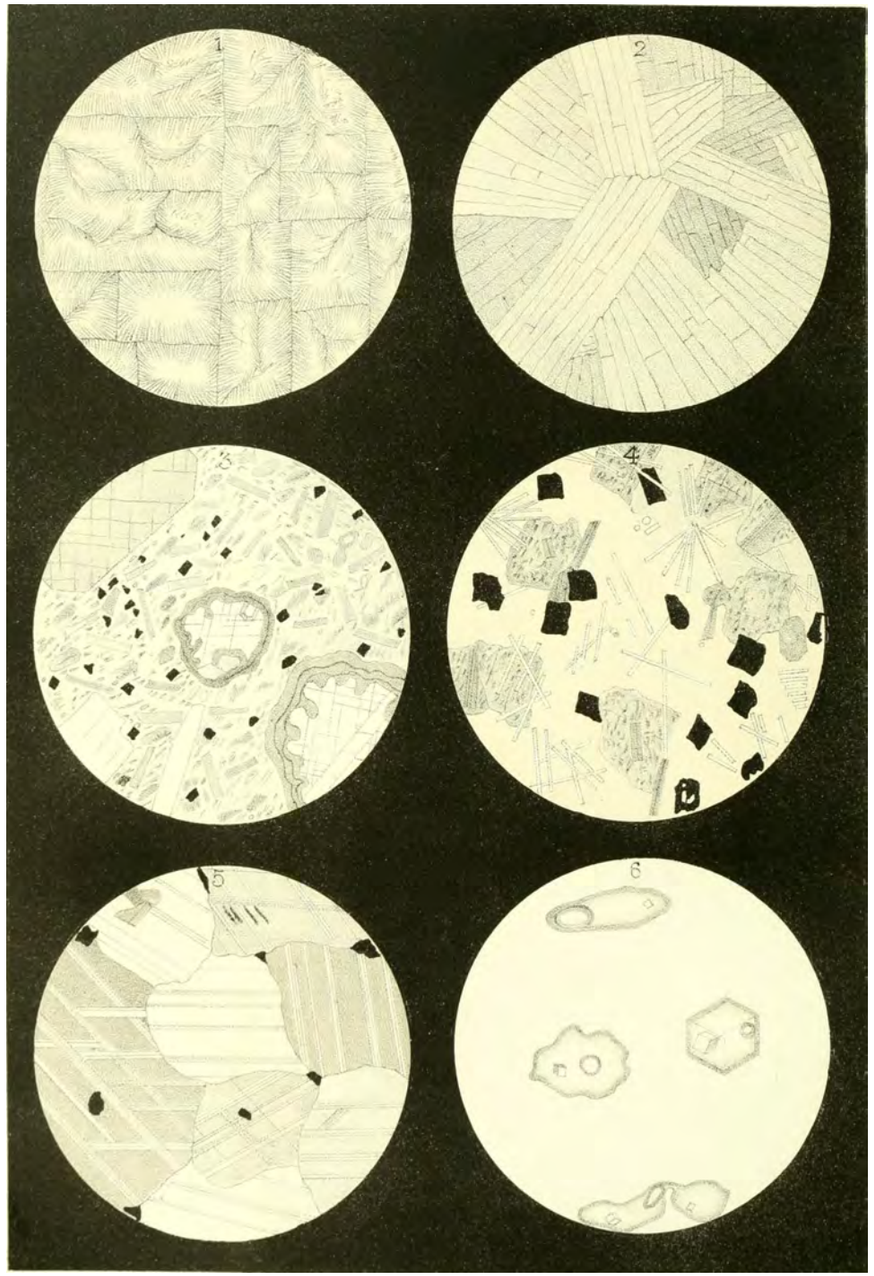


Figure 16. Geological details. The geology of New Hampshire, Hitchcock, 1874, p699.

3.2.2
Device: The Petri Dish

The petri dish was introduced in the Nineteenth century. Prior to its introduction testing occured on large plates sealed with a bell jar[1]. This method meant that it was difficult to control contamination of the sample. The introduction of the petri dish with its neat fitting cover meant that inputs and outputs from the environment and the laboratory could be controlled. In this research The petri dish is within a laboratory concerned with growth, ecologies and behaviours. Extended from a disciplinary lineage of ecological models.

The petri dish allows the landscape to be considered as a growth medium. The petri dish sets the conditions and provides the medium for development.

Within the growth medium inputs are considered to generate growth, variation and interaction. Types, logics, elements are inserted into the growth medium. Matter is the expression of behaviours.

Within the petri dish, elements are introduced to each other and their behaviours observed. The growth medium and the elements are mutually refined.

The petri dish is both a means to develop specific types, and a means to control the medium (or environment) as a formative aspect. Instability is produced between the behaviour, growth and accumulation of the elements and the controlled environment it sits within.

The petri dish is a tenuous place; it both informs and controls growth. It is not the larger environment, yet it is not a vacuum. It is a middle ground that prioritises interaction, inputs, outputs and behaviours. The petri dish produces alternate means of formation by amalgamating narrative frameworks and small-scale material formations.

1 Considine, G. D., & Kulik, P. H. (2002). Van Nostrand's scientific encyclopedia. New York, NY: Wiley-Interscience.

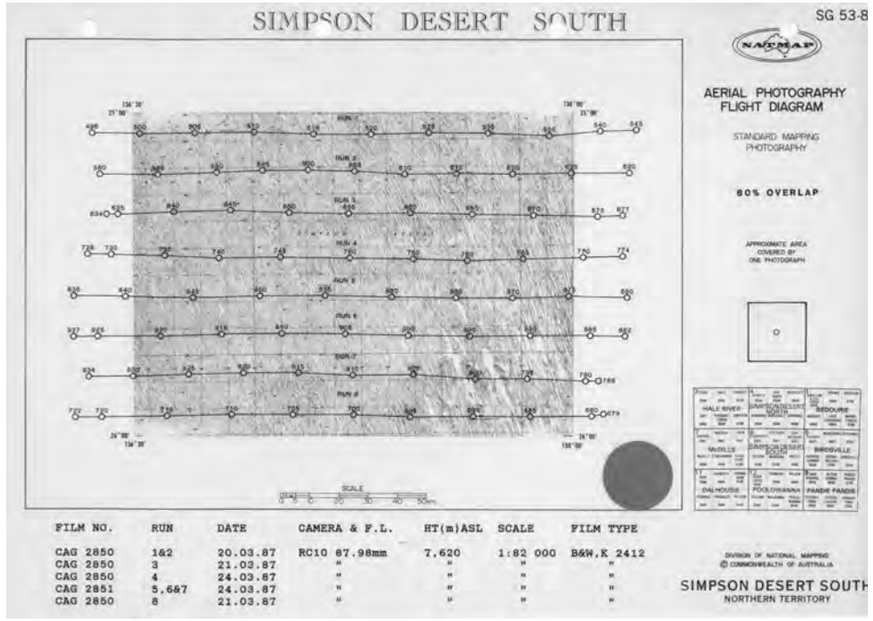


Figure 17. Simpson Desert, Aerial Photography Flight Diagram, 1987. © Commonwealth of Australia (Geoscience Australia) 2015

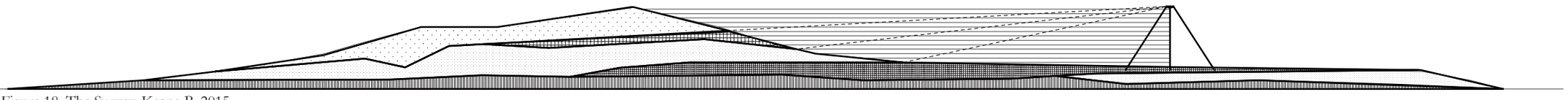


Figure 18. The Survey. Keane B. 2015.

3.2.3 *Device: The Grid*

The grid has its origin in the cartesian coordinate system developed by Descartes in the 17th century[1]. It allowed for a way to link geometry and mathematics. However, the grid has existed in the form of city plans from as early as the 15th century BC. Indicating that the grid as a way of measuring and understanding the landscape has a long and varied history. Here, the grid sits within a laboratory linked to a disciplinary lineage concerned with acts of measuring, surveying and transforming.

The grid sets up point and line relationships, measuring and providing various metrics of matter. It has an infinite horizontal scale revealing an expanse of conditions of landscape. It is limited, however, in the vertical scale. This version of the grid introduces the vertical scale as a means to inform the metrics of matter.

The grid allows modulation – the setting up of intervals, increments, sizes and locations. It can be informed by qualities and/or quantities. It is a mediator between the landscape and the drawing.

The grid sets up parameters. Limits that are evidenced through the transformation of matter to grid and grid back to matter. Instabilities are produced through material glitches occurring in the transition from site to device, device to drawing and drawing to model and back, finally to designed site again. The grid engages directly with material behaviours through modelling and drawing the ground.

1 Considine, G. D., & Kulik, P. H. (2002). Van Nostrand's scientific encyclopedia. New York, NY: Wiley-Interscience.

Figure 19. Dust storm, Arizona. Keane, B. 2007.

3.3 Matter

Emerging from the devices are questions of matter and instability. If matter exists external to the device, what informs its expression? The matter of landscape is inescapable; it exists prior to and long after design intervention. It is already there, forming and reforming continuously. The landscape is an immersive, extensive condition where the visible is merely a series of expressions of the flows of matter. This focus of matter sees the landscape as a series of interrelated material performances, rather than objects, types or ecologies. The performance moves beyond type.

> *The continual cracking of your feet on the road makes a certain quantity of road come up into you. When a man dies they say he returns to clay but too much walking fills you up with clay far sooner (or buries bits of you along the road) and brings your death half-way to meet you. It is not easy to know what is the best way to move yourself from one place to another.*
> The Third Policeman, *Flann O'Brien* (1967, p93)

The transitions of matter described in Flann O'Brien's *The Third Policeman* begin to undo the distinction between the ground, man and 'life'. The clay moves up into the body, the body back into the clay. The movement between the two describes a different kind of being to that of a lifespan of an organism. These movements of matter may be fast – the turbulence of water – or slow – the gradual pressures of geological formation. They may be constrained by physical constraints or by selective pressures in the case of animal and plant species.

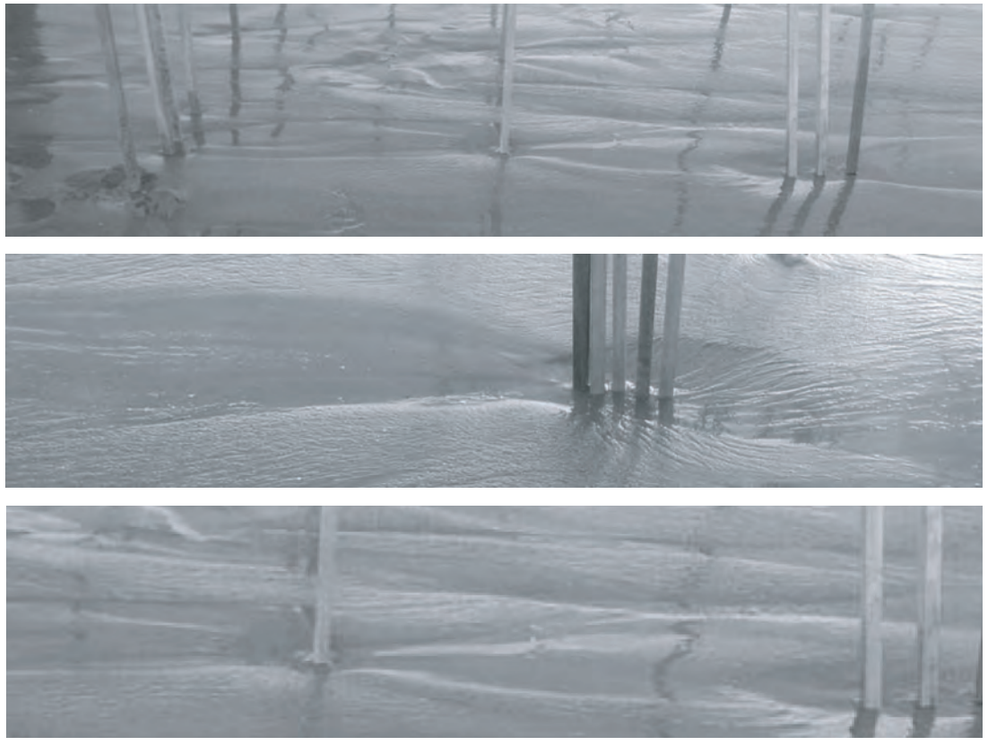
To attempt to work within matter requires the development of specific approaches of discernment and action. To consider devices that can operate within these transitions. A dual approach emerged in the design projects – that of defining

strategies of abstraction and formation. Design, then, can be considered as an act that occurs within matter, a redistributing that varies and constrains the performance and expressions of matter.

> The stakes placed at regular intervals into the sand. The water moves and reorganises the sand, distributing and aggregating into new forms with each wave. The act of staking channels, separates, organises; however the larger act is between the act of the stake, the water and the sand.

The stakes were part of a design studio project in 2004. At the beginning, the task was to use the stakes and string to register the movement of the water. It transformed into a registration of the relationship between the placement of the stakes, the water and the sand. A small part of the project at the time, I have returned to the series of images many times over the years. They have followed me to my projects and my teaching.

The action of the stake becomes representative of opportunities for ways to engage with matter that are productive and open ended, that aim to produce material transformations. The design act is not separate to the environment within which it sits. The question then became, what happens when we cannot act directly, when the device is at a distance? As it is not possible in most projects to directly interact with the matter of site, the drawing, model or analytical material becomes the basis of instructions or constraints for forming matter. What occurs between the device and the landscape? How is matter then considered?



Figures 20-22. Stake experiments, Pt Londsdale. Lucas, C & Keane, B. 2004.

Figure 23. Turbulence, Yarra River, Film still. Keane, B. 2014.

3.4 Instability

Instability is a condition that describes the dynamic interactions of matter that can occur through the mediation of the device. Changes in the environment can be generated through temporal and physical fluctuations. Weather patterns, geologies, and the emergence of biological niches are examples where instability as an inequality in relations is formative – enabling transformation. For example, weather patterns are generated through differences in temperature that produce movement of cold and hot air attempting to find equilibrium. These movements produce subsequent effects that result in a weather pattern always in creation. These effects are made visible through permutations and alterations to the arrangements of matter – expression.

If matter is not a continuous physical condition, but rather a condition continuously disrupted within the environment, could this also be true for the devices of perceiving it, rendering it (drawing/making) and designing the landscape? This question has influenced the research by emphasising transitions that occur within site, and between site and the acts of design, where the design act is one of mediating of matter through a series of devices.

Instability is the nature of transitions of matter as well as referring to slippages and changes that cause variations as a result of the action of the devices: it is both an observable physical condition and also a means for conceptualising the effects of ways of looking. The operations of the devices indicate that it is the inherent constraints of the device that generate instability and allow for movement and expression. With the microscope, the instability between the projected figure and the landscape. With the petri dish, instability between inputs and outputs of a system. And with the grid, between geometry and material expression.

Payne writes about Galileo's telescope - "the instrument, as it were, made the act of seeing physically apprehensible" and sets it up in opposition to the act of painting - that "emerges as a disturbance in the apprehension of nature" (Payne, 2015). Positing that the object (telescope) is on one side and the concept (perspective) on another. However, this is a false separation. The devices not only makes the act visible, they also change what is seen. They introduce their own form of disturbance and disruption - instabilities into the subject.

The design act is a construction of site that integrates matter and devices of notation, growth and framing that are used to understand it. Instability extends to the larger position of my design practice. The works propagate and promote relationships that are open and, as a result, continuously generative – they create myths out of commonplace instruments, conceptions or conventions.

Figures 24-25. Alcove of the Lions. Arnaud Frich. Retrived 9th August 2015. Centre National de Préhistoire. Ministère de la Culture et de la Communication

3.5 Amalgamation

The Chauvet cave in France, the subject of the film *Cave of Forgotten Dreams* (Herzog, 2011)is a crucial reference towards a way of thinking about how to produce multiple conditions of formation.

The cave contains many drawings of animals. The animals are made alive through the interaction between the interior surface of the cave, the charcoal lines and the flickering of a lantern, thus producing an effect that Herzog refers to as a kind of 'proto-cinema'. The soft undulations of the cave walls have been smoothed through the passage of time. At one moment the surface raises to form the shoulder of a horse, at another the hipbone. It is not possible to separate the material of the cave from the lines of the drawing; they work together, inseparably forming the image. The animals are animated through the through the repetition of elements – the spindly legs of the animal appear to be shifting, running and jumping in the flickering light.

In the cave, there is no clear moment where the drawing or cave starts and finishes. A complete integration of the cave, the figure and the line occurs. The cave inflects the line and the line accentuates aspects of the cave/horse. The drawings in the Chauvet cave hint towards a move from direct engagement with site to a possible middle condition.

The drawings however, are still directly rendered onto the cave. What happens in the separation of the drawing from the surface? When the line is distanced from the matter of site? At that moment, devices of abstraction and translation become foregrounded as primary constructions of landscape. The cave hints at the nature of the device. It is not inert; similar to the undulations of the cave's surface, the irregularities of the flickering light, and variations in the charcoal, each device introduces variations of matter through the limits of their operation.

Transitions of form are established through mediation between matter and its framing, an act of formation. It is no longer the picturesque view, separated from its environment, but an enacted and lived environment that is inclusive of the modes of observation used to consider it. Where the qualities of landscape (multiple scales, dynamism and material transformation) and the means to perceive it (surveys, instruments and geometries) are integrated in modes of design process.

3.6
Community of Practice:
Halprin & Corner

This research seeks to extend an understanding of the way in which landscape is constructed through the devices we use to look at it. Generating multiple interactions between site and device to produce design. Often the devices - instruments, models and mechanisms are applied without modification in Landscape Architectural practice to establish the landscape prior to design.
The works of Lawrence Halprin (projects: 1955-2005), and James Corner in his work as both a practitioner with Field Operations and an academic (projects: 1986-present) are two fundamental points of influence for this research. Both engage directly with devices and models from other disciplines. Halprin with notations derived from music and dance and Corner with models from ecology. The practices are divergent. Halprin's work comes from a modernist perspective, rigorously ordered and formed. Corner, alternatively, works within a thoroughly postmodern, ecologically derived framework. Both practices use abstractions of the natural world as a means to mediate between scales of action – between the site, the phenomena and processes of formation.

As a part of reclaiming a critical approach to the device, two key projects are re-read through the device. The terms variation and constraint discuss the agency of the device in terms of matter. In the fountain of Lovejoy plaza, Halprin provides an example of the direct relation between material expression and form through the use of the notional device. Demonstrating that the device can allow for a set of formal relations to be established that produce multiple performances. On the other hand, Corner offers possibilities for understanding the large-scale landscape as being in constant formation – in this case using a successional model as device to allow an evolving site to emerge.

"Limit is what makes every object exist concretely, by constantly endowing it with its proper form and individuality. It is also what determines the logical order of events by removing them as far as possible from pure chance. On the other hand, neither history nor evolution would exist if, in addition to limit, there did not also exist a principle of an opposite nature, which thwarts the tendency of every object to remain rigidly fixed within the contours imposed on it by the principle of limit." (Zellini, 2005. A brief history of infinity)

In order to outline a relation between the two a comparative association is made between the Lovejoy Plaza (Halprin) and Fresh Kills Park (Corner). The association begins to reveal differences in where the device is sourced and how it is deployed. Thus, Halprin and Corner form a lineage that this research seeks to extend through a combination and extension of approaches read from these works. The much-discussed lineage from McHarg to Corner through the Penn school is not in question here. The sequencing of matter and development of a design led ecology of form makes the relationship between Halprin and Corner more relevant to this research.

Constraint – an action of the device

Coming from divergent parts of the multiple lineages of Landscape architecture, Halprin and Corner each have specific references and devices.

Halprin draws on notation from music and dance to produce a way of making form. He reformulates the idea of a score to produce transitions of matter. The notational device sets the constraints that enable multiple formations – they are catalysts of material performance at the scale of the site. The score introduces time, sequence and performance into the plaza. Halprin's matter is active; his notational diagrams choreograph timing, directions and effects – constructing a live phenomenon. "Movement and choreography have always been a consistent influence on me and my work…natural movements characterized by water and natural forces and the evidence of natural change over time have led me to my endless fascination with natural processes." (Halprin, *Notebooks 1959 to 1971*, p. 10). In this way the notational device allows mediation between the processes of natural forms and designed space through complex interactions between matter and phenomena.

Corner is interested in ecology and its expression through models of succession and transformation from the ecological sciences. Here, the device is expanded to be

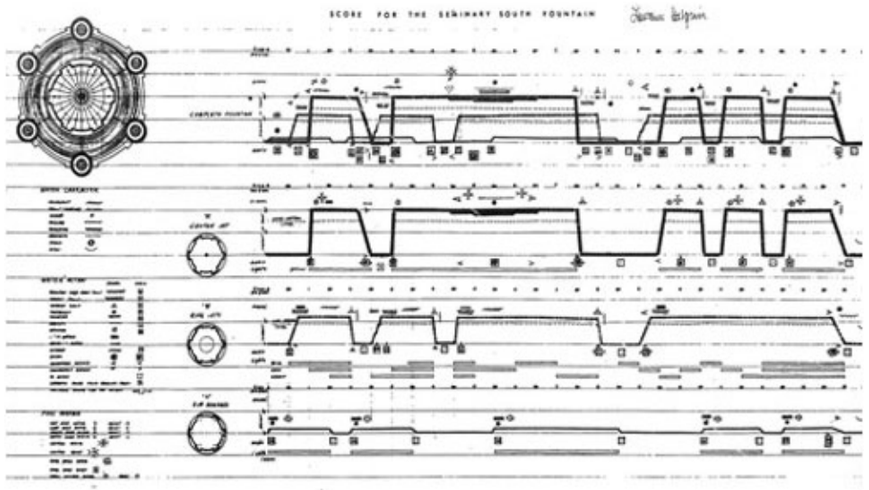


Figure 26. Fountain Choreography. Lawrence Halprin, 1968.

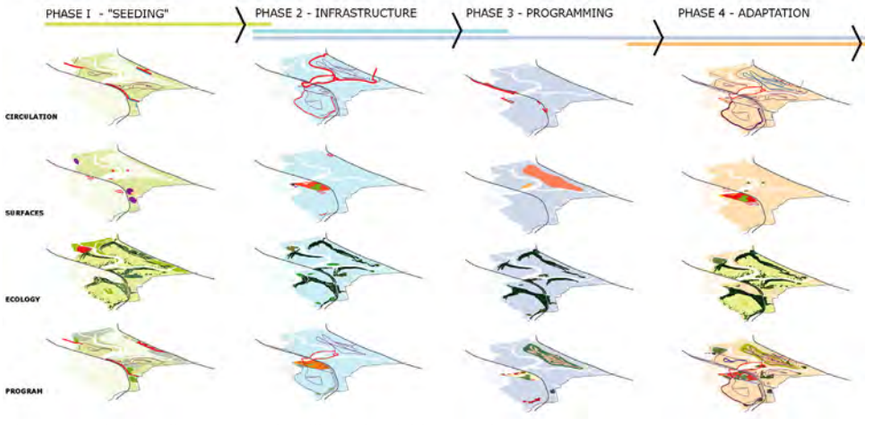


Figure 27. Phasing diagram. Fresh Kills Park. Field Operations, 2001.

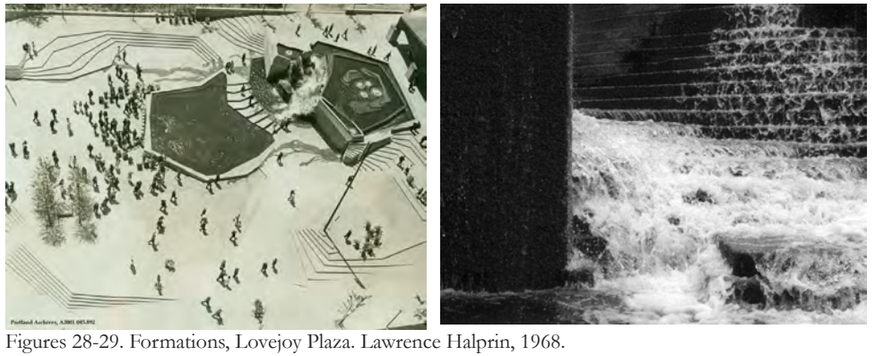
a model as well as an instrument. Through the succession model Corner produces sequential relationships, a choreography that is set in motion, not completely determined. Fresh Kills uses biological processes to catalyse the formation of the park. Matter is speculative, working from pure performance and leaving form to chance. Through the diagram, Corner predicts and suggests and unfolding, phasing over time where the performance is enacted by the various floral and faunal elements.

Variation – the production of the multiple

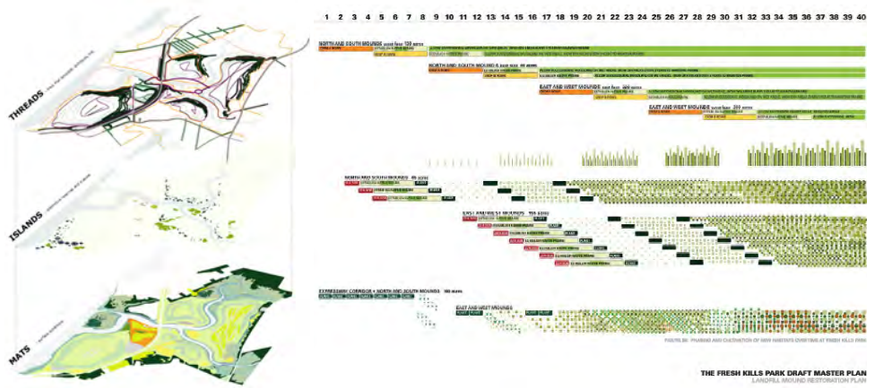
The notational diagram and the phasing model respectively allow the production of multiple forms in the landscape.

The fountain in Lovejoy Plaza produces material formations in constant variation. These variations are not emulations of natural forms; instead they constitute a reforming of its processes. The abstraction of topography in the surface of the fountain produces a transitional state between 'natural and artificial'. In the fountain, the two key movements occur through the most physically transient groups of matter, water and the body. In contrast, the overall form of the plaza is rigid – a geometrical figure that simulates the local geology.

The Fresh Kills project engenders variation through overlay. The transformation of matter is a combination of the threaded surface and the ecological processes that are seeded across the ground. The material of garbage, refuse reformed, provided a smooth surface on which the succession was played out. Ecology is directed through a speculated release of species that unfolds and interacts on the surface – part of, but remaining outside of, the environment. It is a setting in motion that still holds to the idea of ecology existing outside of human experience and intervention. It is a superficial separation between ground and species.



Figures 28-29. Formations, Lovejoy Plaza. Lawrence Halprin, 1968.



Figures 30-31. Overlays, Fresh Kills Park. Field Operations, 2001.

3.7 Practice of the multiple

Between the two a range of possibilities emerge for investigating the operation of formation, expression and release through a mediation of site. The devices are seen as constraining forces that produce variations. These variations occur at differing scales of action and outcomes.

The practices demonstrate the agency of the device as something that can both form site and generate design outcomes. At the same time indicating an area of research to look at not just the application of the device, but its calibration and modifications as integral to a design practice. The research acts in the gap between the material performances of Halprin and the open- ended processes of Corner. Reconsidering the formation of site through the device as a primary act and developing techniques that allow for materialisation at multiple scales. Where a modification of the device allows for a mediating between material expression at the small scale and large scale processes that generate form.

A practice of the multiple

The community of practice offers an insight into the relation between device and form. Positing that multiple expressions of form can be produced through the constraints of the device. An ability to recalibrate a device from another discipline in order to produce multiple expressions of form is instrumental in developing a practice of the multiple.

The contribution of this research to this lineage is a focus and elaboration of the devices that are employed from other disciplines, specifically using them to produce techniques of form making. Extending on the community of practice.

The research has contribution to the discipline at two scales. At one scale, the framing of the device allows for a rethinking of the multiple lineages of landscape

3.8 Techniques & Outcomes

architecture. Generating a narrative framework for engaging with 'landscape' and generating scales of action through the laboratory, the device and the actions. At the other scale, the modification of the device within the laboratories produces a series of techniques for design.

A series of outcomes were produced as a result of investigating the device:

- Establishing narrative structures to develop multiple lenses that link larger thematics to design projects and actions.
- The identification of three devices for landscape architecture allowed different forms of site and subsequent actions to emerge.
- Reframing of the foundation of the devices unpacked the underpinnings of the lineage of the device.
- Modification of the devices produced new techniques for the formation of landscape.
- Instability emerged as a key to understanding the mediation of landscape through the devices.

A series of techniques were developed through the use of specific devices:

- Test relationships between projection/geometry and the matter of site.
- Produce alternate means of formation.
- Engage directly with material behaviours through modelling and drawing to produce a condition of ground.

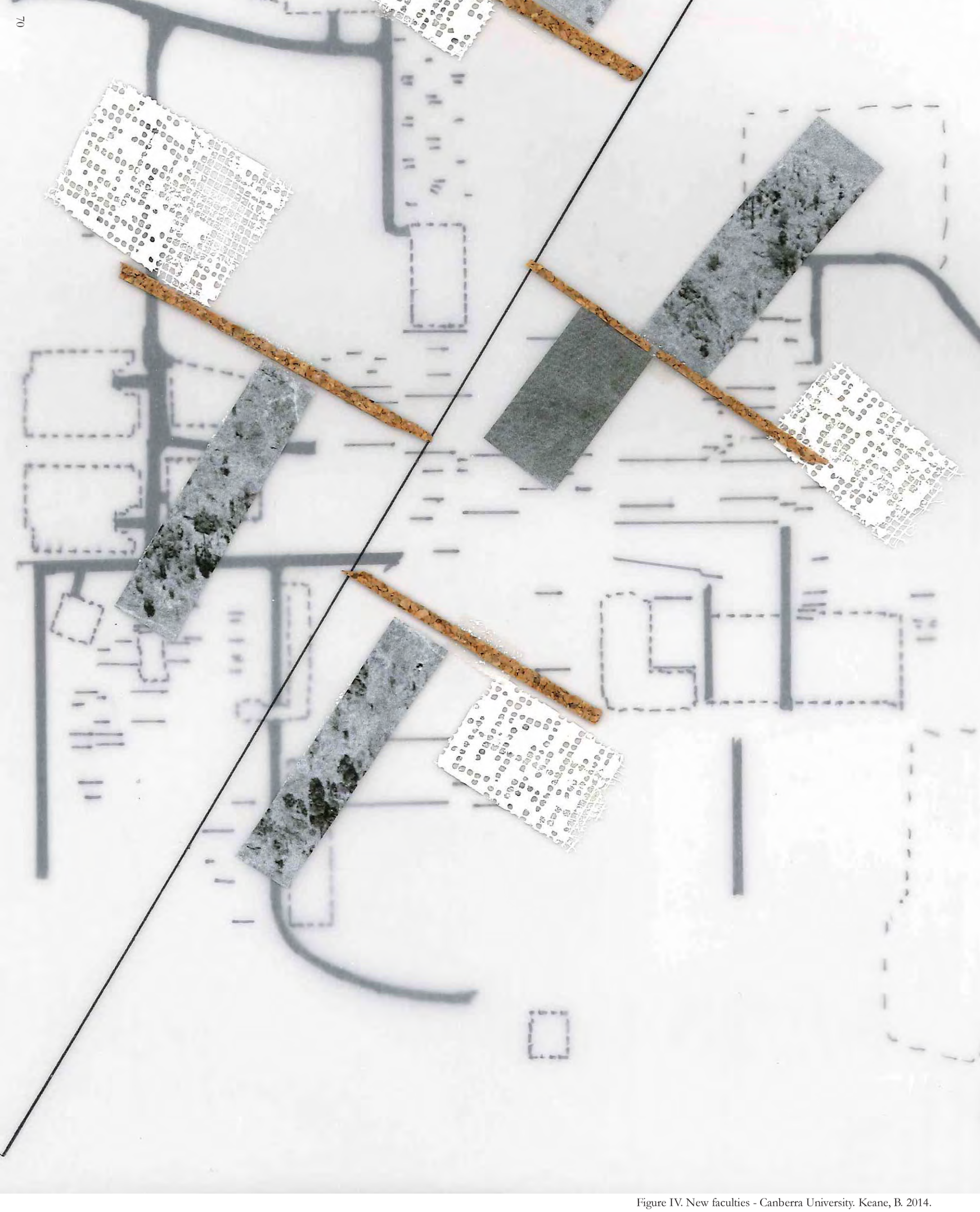


Figure IV. New faculties - Canberra University. Keane, B. 2014.

4.0 Laboratory 01

The Microscope

Overview

The microscope

This Laboratory investigates the landscape through the device of the microscope. The shifting of the microscopic lens reveals the tension between the static and the dynamic in the forming of landscape. Through the action of rescaling the microscope realigns landscape performances with geometries and produces variation. A series of experiments explore the unstable relation between the rigidity of geometry applied in plan and the performance of the environment. The Laboratory enables mediation through the microscope, which acts by rescaling, realigning and adding. A theme of projection emerges.

4.1 Laboratory Description

Looking over the terrain, the device is housed in a laboratory and floats a metre above the landscape. Its inverted oculus perceives all that is visible on the surface. It is viewing both a singular place and, at the same time, all space spreading out horizontally all the way to the horizon. The eye of the operator gazes through the lens towards the landscape.

This device is of course no exception to the distortions suffered by its kind. However, the problems of superficial distance and loss of detail (matter) are ameliorated by the benefits of the flattened and controlled plan it that produces.

The rectangular laboratory surrounds the downward facing oculus. Along one wall there are numerous devices of projection (microscope, overhead projector, slide carousel). Along another, taped to the wall, is a series of images: a plan of Versailles, McHargian maps a carte d'etude, images of Cedric Price's Potteries Thinkbelt, and adjacent, a Wardian case containing a sickly looking plant.

The device itself scans the environment, picking up on rigid forms, geometrical figures and their relation to the transient figures within the environment.

To the side, a table holds altered plan drawings of Melbourne's Hoddle Grid, and Ho Chi Minh City centre.

On the overhead projector, Burley Griffin's plan for Canberra is under inspection. Next to it, a series of experiments sit on transparent light-boxes. The drawings extend the geometries from the Griffin plans onto and over the landscape, moving underneath the oculus.

A lab report entitled 'experiments towards projection' sits on a bench.

4.2 Lab report:
Experiments towards projection

Aims/objective:
The aim of this series of explorations is to investigate scaling through the microscope in order to develop techniques to mediate between the immaterial nature of geometry and the environment. Questioning the nature of projection – by rescaling and realigning and associating geometrical and performative figures.

Hypothesis:
The projection of geometry can be used as a catalyst to unfold landscape performances.

Device:
The orthographic plan is the primary terrain for this experiment.
The device is the microscope.

Method:
Create a relation between the static and dynamic by taking an existing geometrical figure. Reorienting, extending, rescaling and realignment as processes. The device embeds geometry as a set of rules to be unfolded into the environment.

Background:
Works were selected to form this laboratory as they represent a series of smaller connected explorations that are looking at the relation between scale, the line and material performance. Each on its own is perhaps unremarkable; however, as a set they begin to inform a series of actions that are further explored in a larger project – Generating Faculties, University of Canberra master plan.

Previous tests on the nature of plan, projection, the line and rescaling were explored in multiple forms across a number of different projects and

Layers

explorations.

The first in a series of overlay plans of Ho Chi Minh City explored a possibility for the site to be rendered onto multiple surfaces. Here the microscopic lens is adjusted to look at series of slices at the same scale but out of spatial order. The focus of the microscope is compounded. The overlay creates alternate relationships to a singular planar slice. Variation occurs in the layers between the acetate sheets.

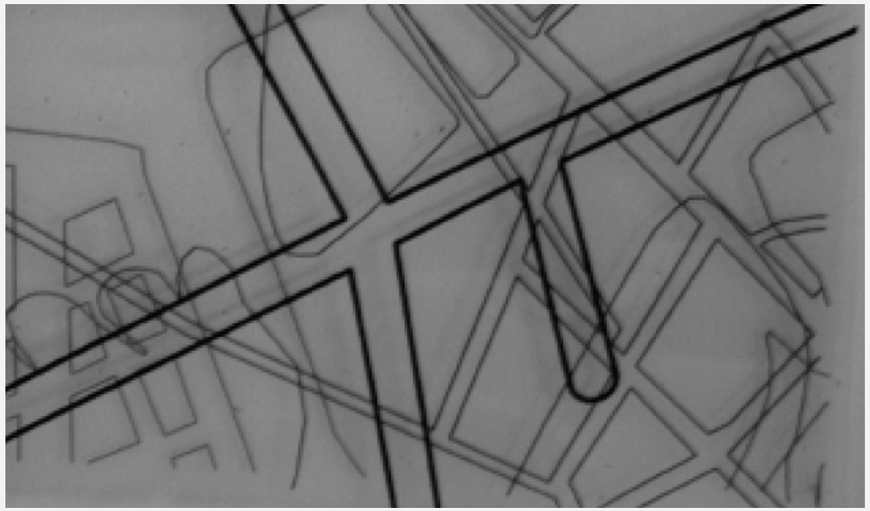


Figure 32. Layers, HCMC. Keane, B. 2009.

Folding

Ho Chi Minh City examines the scales of the city grid. One move is the nesting of the grid within the grid. The second is the folding of the grid back onto itself. The acetate surface was reconfigured after the initial moment of projection to enable the performance of the material to represent other conditions of informality found in the environment. It tracks physical consumables (plastic, food) that are dispersed throughout the city. These materials are accumulated and integrated into the city fabric, forming an expression of the economic and social phenomena specific to Ho Chi Minh City. The layering, overlapping and shifts in scale re-form the city according to processes of distribution and collection.

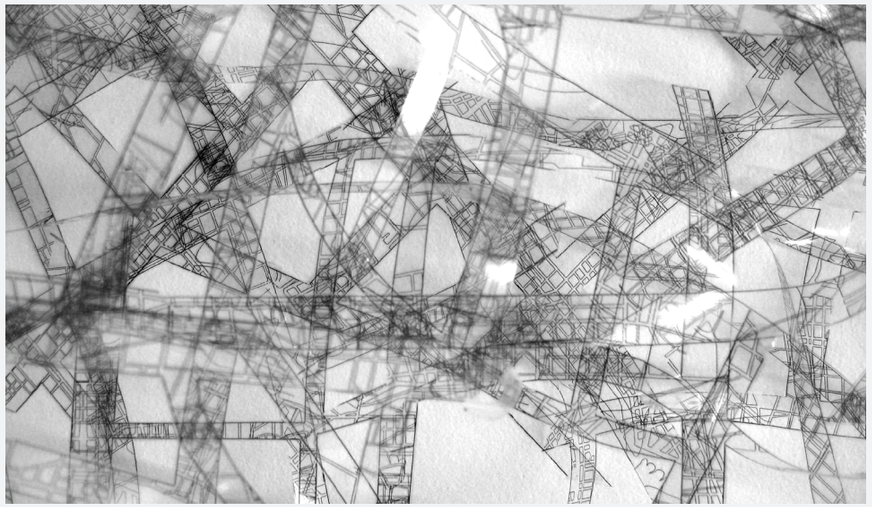


Figure 33.Folding, HCMC. Keane, B. 2009.

Revealing

An archaeological cut through a plan of the CBD of Melbourne is a layering of site. The microscopic lens retains the scale in its view, but the timeframe is altered. The line, generated through a best fit between the various uncovered moments, forms archaeological cuts through time, unveiling multiple histories of site.

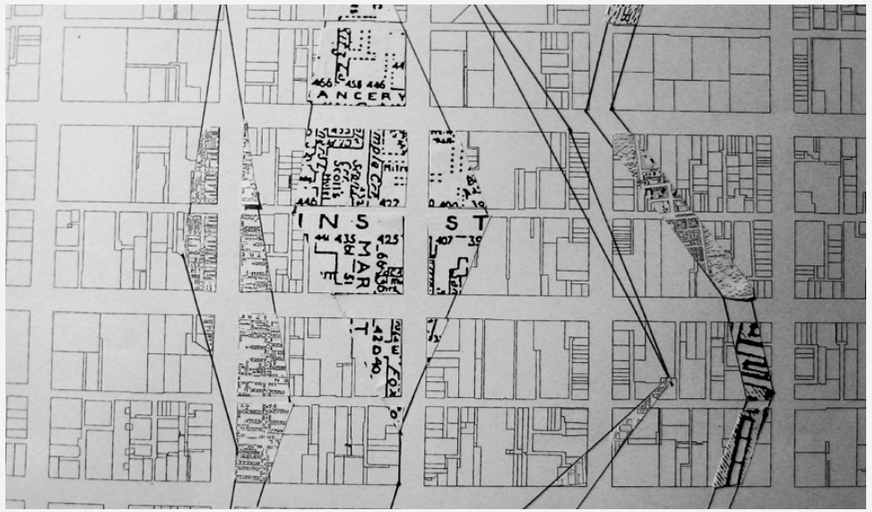


Figure 34.Revealing, Melbourne City. Keane, B. 2008.

Time

A dense plan is layered through a repeated process of drawing the line, overlay, line, and overlay. Drawn directly onto sticky tape, it is then stuck together, making a three-dimensional overlay. At the end of the process it is not easy to recognise the tape and the line as distinct entities. The two become a single object. In this case the lens of the microscope focuses on the production of a new object under the scope. This begins to adapt both the microscopic lens and the slide mount that it views.

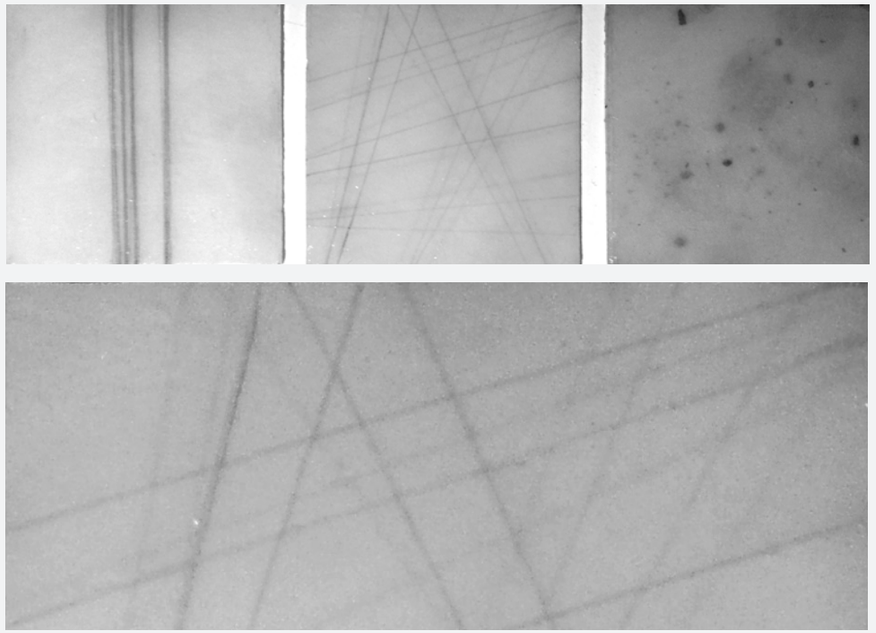


Figure 35.Density, Material + line Testing. Keane, B. 2011

Poured

The final background experiment follows on from the one above. It considers the expansion of the line under the microscopic lens. Prioritising transformation between line and material. A series of lines were cut into a piece of cardboard. Plaster was poured into the cut lines. The plaster transgressed the extent of the cut lines, spilling underneath and along the corrugations. Here the line is thickened through the performance of the plaster.

Cumulatively, these experiments reveal the agency of the microscopic lens. Suggesting a way of working with landscape that integrates line and performance by rescaling, inserting and reworking the line and its materialisation.

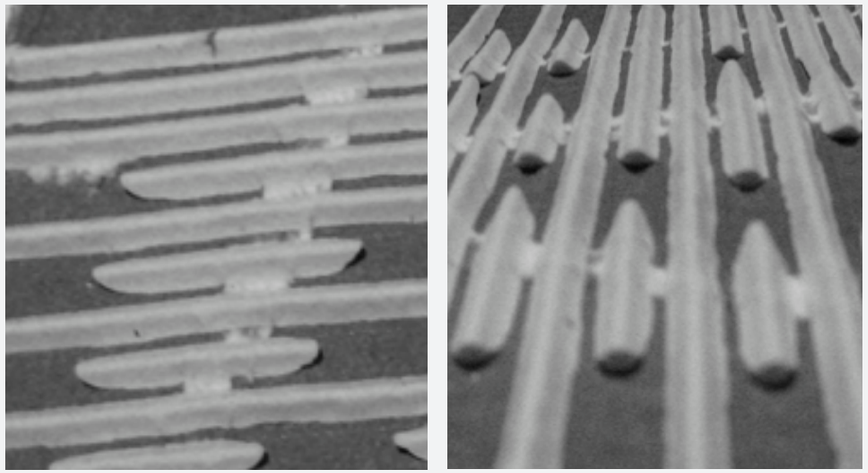


Figure 36.Pouring, Material + line Testing. Keane, B. 2011

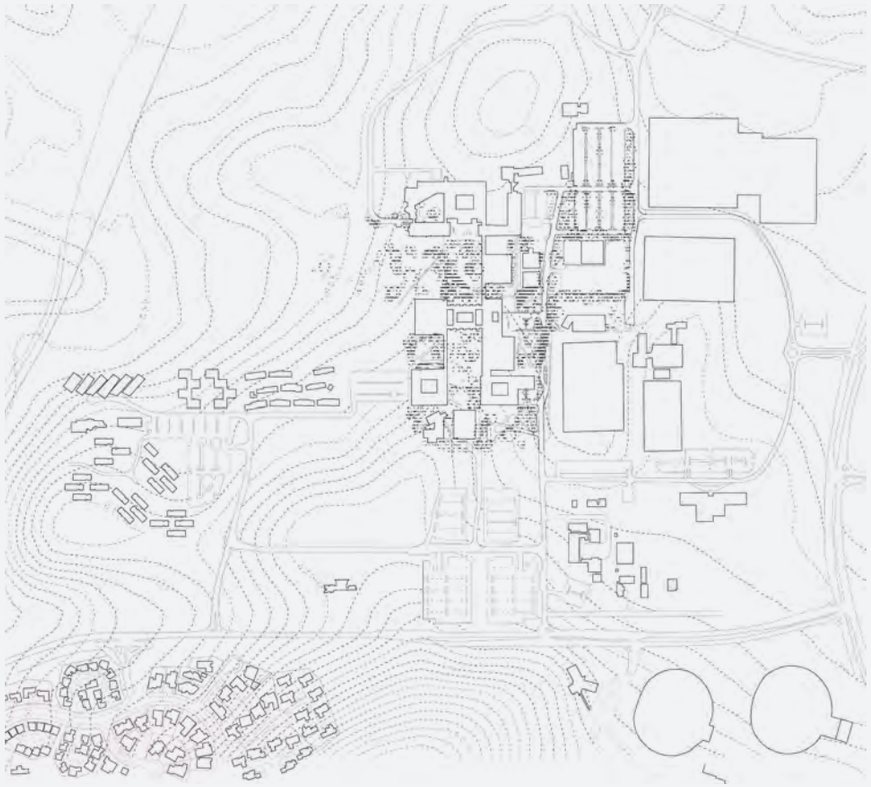


Figure 37. Canberra University campus. Keane B. 2014.

Site:
The purpose and siting for the main experiment is a new master plan for the Canberra University Campus. The campus is situated to the north west of Canberra's city centre. Originally developed in response to a design competition, the project took on a life of its own.

Process:
The background experiments began to suggest ways in which the various scales and operations of site could be revealed through the device of the microscope. Further, they began to intimate a way of considering the framing of the relationship between the line of the drawing and the performance of material/site as generative.

Preliminary investigations for the project used the road network as a means to organise the campus, leading to a series of thickening of the road edges to accommodate functions of each faculty, testing grounds and classrooms. Through providing an alternate dimension to the site, a second iteration was initiated, as there was no catalyst to activate this movement and growth from the road network.

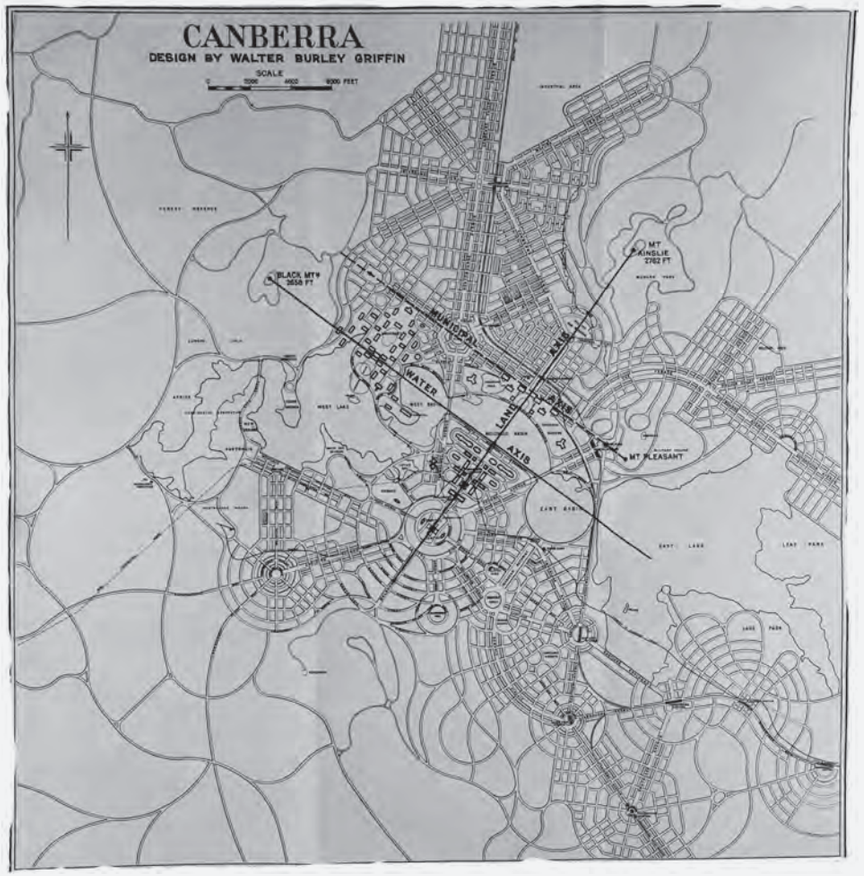


Figure 38. Plan of Canberra, W.B. Griffin, Courtesy NAA.

A re-reading of the Griffin plan was undertaken – through the microscopic lens. In particular the early layout and orientation plan was reconsidered. Looking at the plan, what emerged was a number of associations created between the plan and the landscape that it is projected over.

A series of important moments emerge through re-scaling the drawing and shifting the hierarchies.

Axis – the three axes – Land, Water and Municipal. Land and Water align with key landscape features, beginning at the highest point of the surrounding mountains. The Municipal axis integrates the operations of the capital with these features, providing a centre point for individual geometries that define areas of the capital. The axes provide a centre point for the orientation of civic functions through the circle and hexagon. Between the axes infill occurs.

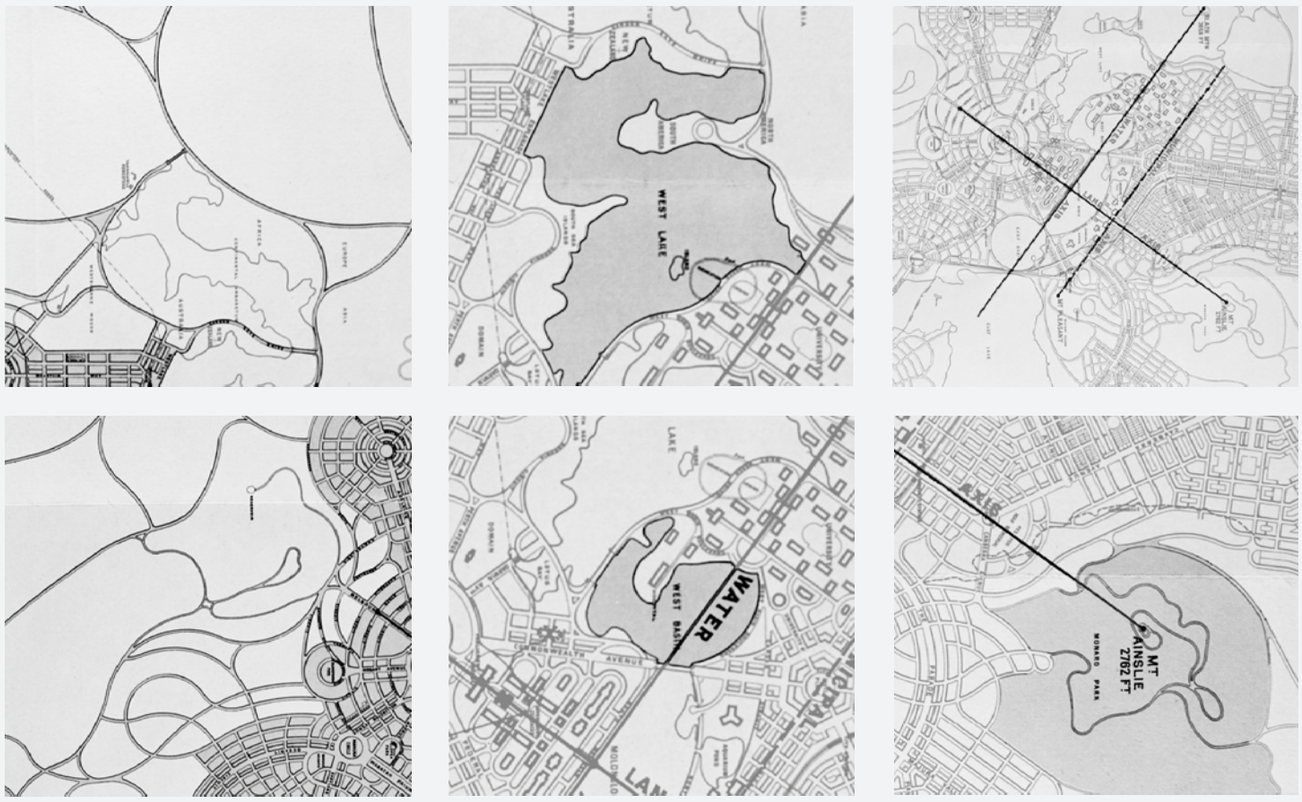
Armature – As the foci point of Canberra, the Lakes are both constrained and protected by the geometrical figures that surround them. The degree of constraint shifts, from tight restriction around the edges of the west lake, to the semi open enclosure of the west basin, through the arc of the Monolglo basin to the perfectly encircled east basin.

Unfurling – the geometry of the Griffin plan is tightly wound at centre, and begins to lose definition and rigidity at the edges. Road infrastructures begin to loop and link the various geometrical figures together.

As a result of this re-reading a series of processes was initiated. The central axis of Canberra was extended, zooming out and across the Canberra University site. The axis is realigned and extended to the north, upwards towards the University site. The lines were then realigned and extended through the environment of the campus. This axis becomes a carrier for the unfolding of subsequent geometries, both formal and informal, in the site.

Lab report:
Experiments towards projection

Unfurling **Armature** **Axis**



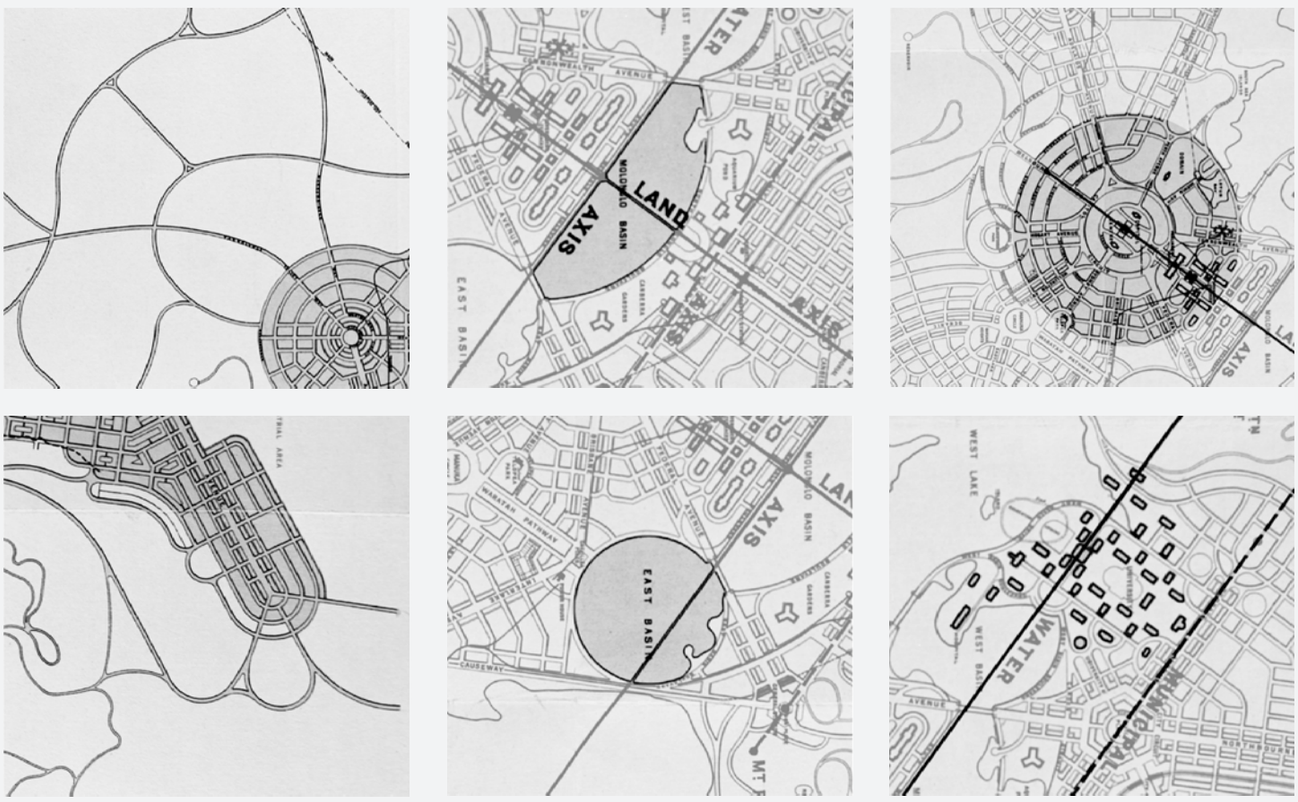


Figure 47-50. Infrastructural unfurling.

Figure 33-46 .Armature around lake.

Figure 39-42 .Axis and end points.

Figures 29-50. Modified from Griffin, W. B. Plan of Canberra, NAA.

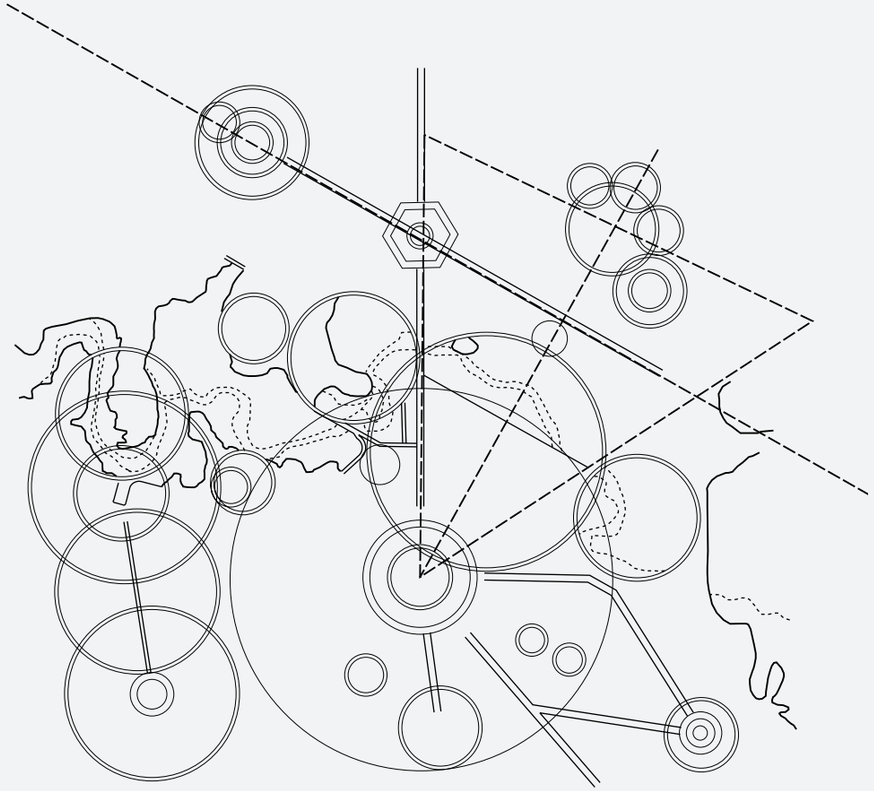
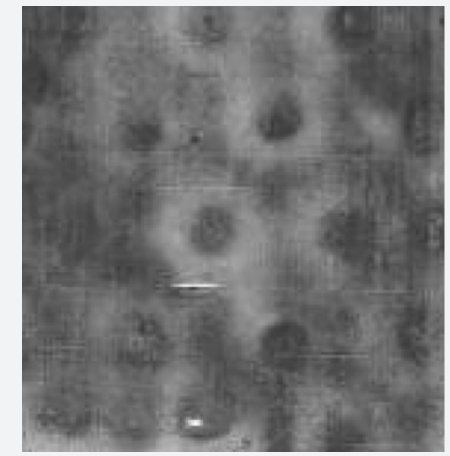


Figure 51. Griffin Axis - Extension. Keane B. 2015.

Figure 52. Armature - River & Lakes extents. Keane B. 2015.

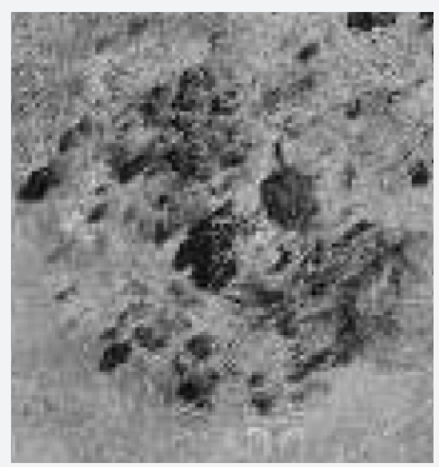
Adjusting the microscopic lens, the site was analysed through the various performances obvious from above. Car parking is revealed to range from organised asphalt, to aligned parking on gravel, to open gravel areas that are home to marks from spinouts. Drainage produces a series of subtle permutations in the surface, resulting in vegetation changes. The maintenance strategies – irrigation, pruning and mowing – create patterns at various scales.

Maintenance



53-55. Maintenance forms.

Drainage



56-58. Drainage forms.

Carparking

59-61. Parking forms.

Figures 52-61 Modified From. Google Map data. Google. 2014.

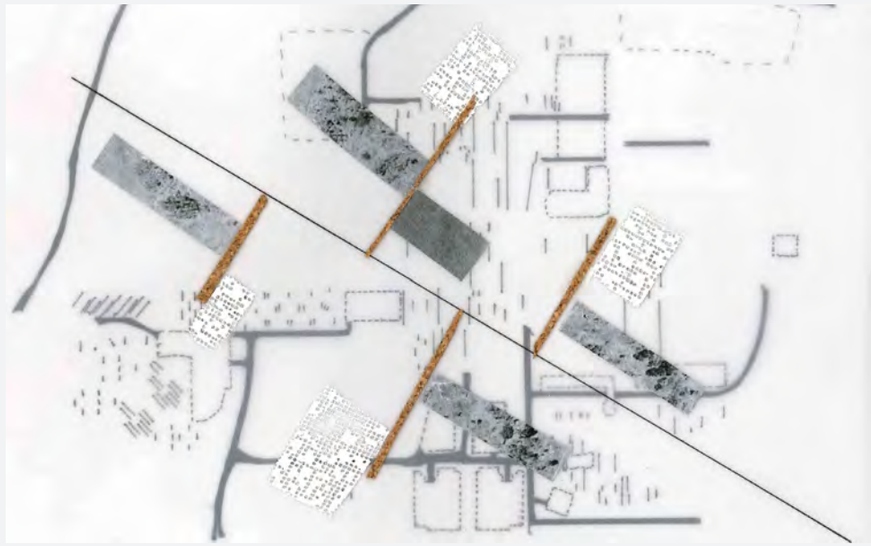


Figure 62. Multiple faculties. Keane, B. 2014.

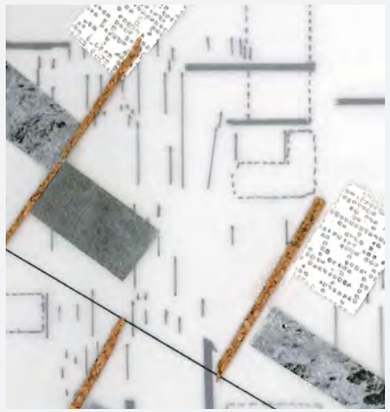


Figure 63. Faculty type 1.
Keane, B. 2014.

Figure 64. Faculty type 2.
Keane, B. 2014.

Zooming out again. The extended line from the Griffin plan sets up a loose armature on site for the organisation of the various performances. Car parks, classrooms and laboratories were rotated along the lines and composed in small groups, unfurling various maintenance and drainage types along with them. Topography produces variations of these groupings and suggests the continual production of the campus: a strategy for the growth of the university.

Results/ outcomes:
The unfolding and mediation of the geometry begins to inform an alternative formation of the campus site. It offers a distributed and evolving model for change, expansion and transformation – 'generating faculties'. However, the projection remains on the surface. The potential yet to be realised of unfolding multiple variations of the campus through the site.

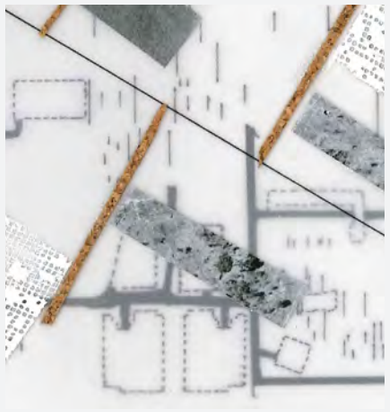


Figure 65. Faculty type 3.
Keane, B. 2014.

Figure 66. Faculty type 4.
Keane, B. 2014.

Figure 67. Faculties in landscape. Keane, B. 2014.

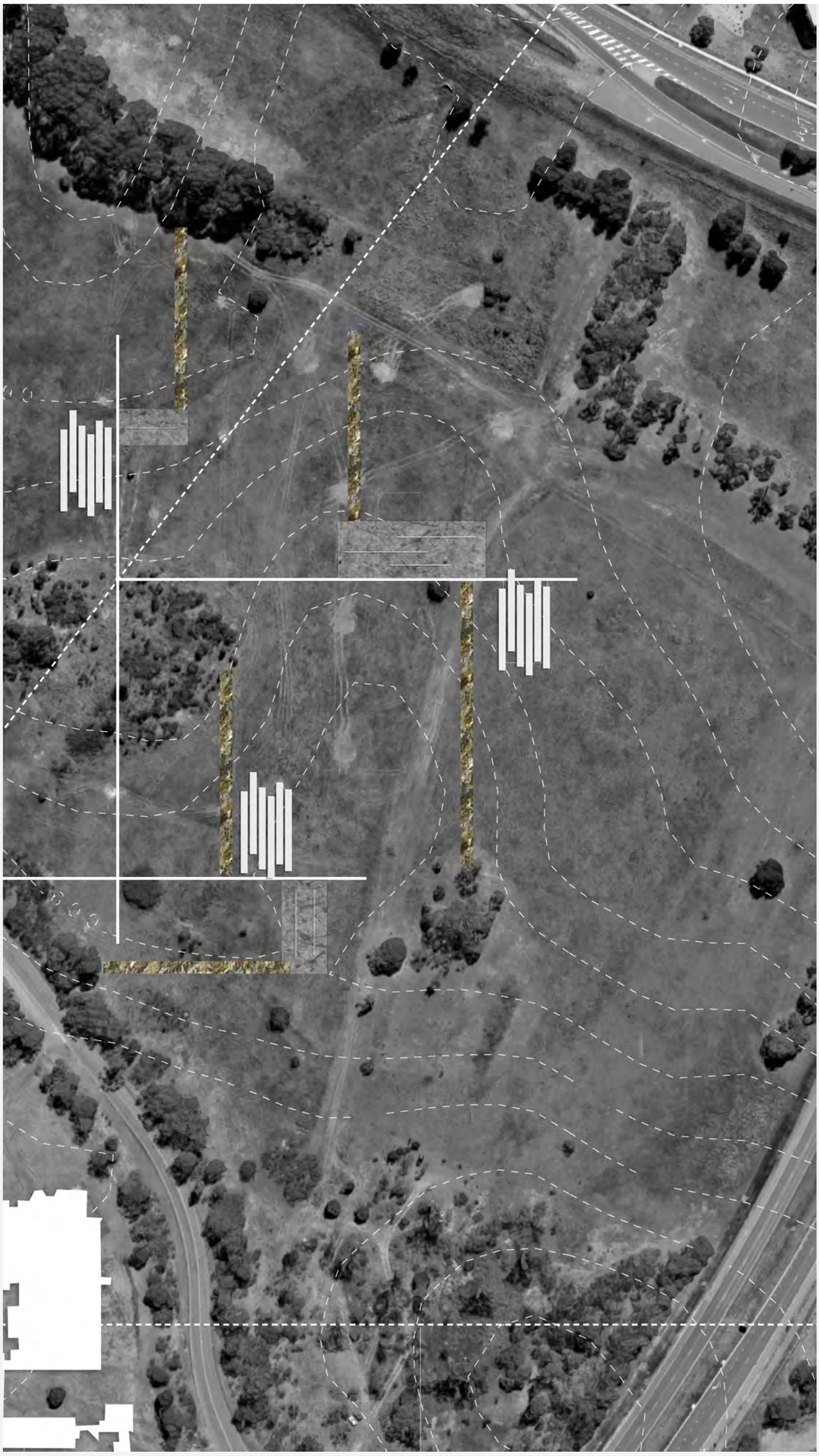


Figure 68. Faculties projected on the landscape. Keane, B. 2014.

Figure 69. Through the scope, vegetation. Keane, B. 2015.

Figure 70. Projections onto, layering through scale. Keane, B. 2015.

Figure 71. Realignments, projection through the scope. Keane, B. 2015.

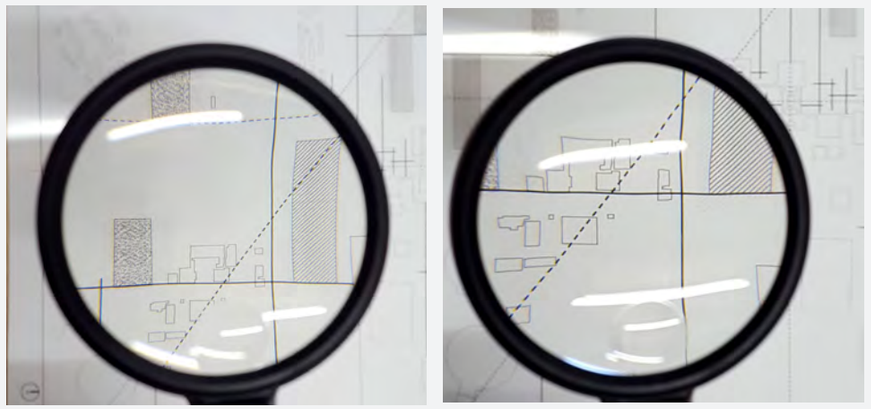


Figure 72-73. Variations of clusters. Keane, B. 2015.

4.3 Discussion

Introduction

The project is situated in Canberra, and was a response to a competition held by Canberra University for a redevelopment of the campus on the outskirts of the city. The device of the microscope was employed as a means to zoom in and out, and to create new relationships between the infrastructure and landscape performances.

In the project, the notion of a tension between the projection of the line of infrastructure and the landscape proposes a way to integrate conditions at different orders – the institution, the Griffin geometry and the environment. Within the project the institution is displaced through the geometrical figure, embedding it within a scale of the larger landscape.

4.3.1 The line

> *In her book* Stasiland*, Anna Funder asks the man who drew – in chalk, on the ground – the line that marked the position of the Berlin Wall, why he did not escape. The man replied that 'at the time, it was only a line.'*

In one moment, an inside and an outside, a here and there, an us and them, was made. This anecdote serves to remind us that lines on a plan are truly made manifest when projected and materialised on the earth. The moment of drawing for this man was an interim state. It created a moment of instability, an in-between, dividing the plan and the finished wall. That is not to say when the line becomes wall that the effect stops; it simply sets in motion new forms of movement on the perimeter.

A line reaches the landscape through an act of projection. It is a figure created between the projection and the ground. The competition entry for the Canberra University Campus investigates the ability of the projected line to transfer and transmit information to the environment. The aim is to continually produce the line, thus prolonging the interim state of instability between infrastructure and environment.

The line is concerned with its own operational logics and agency (grids, figures and orders). The environment has its own performance and logics. The tension between the two can be seen in the grounds of the Palace of Versailles can be viewed as a series of formal constraints that are activated through the projected line. André Le Nôtre designed a number of radiating axes from the Palace. Extending outwards, the projection visually claims the surrounding landscape. It is a mediating device for transition between the town and the Palace, both spatially and politically. In doing so, the lines, as a by-product, generate differences in the spaces in between. Clusters and groupings are formed that align and are expanded by both the institutional (Marie Antoinette Palace and grounds) and the programmatic (grounds keeping, orchards,). The line becomes a mechanism for differentiation and growth. The multiple expansions of Versailles mean that there are various sizes and scales of these axes and resulting spaces.

Moving from Versailles to look at the city of Canberra, in particular the Walter Burley and Marion Mahony Griffin Plan. We can see that the plan is curious, it acts as a means to control and organise the city into geometrical figures, yet at the same time forms (to a degree) an open armature that contains the river and hills of the areas. As an articulation of political logics of control, and in particular modes of centrality, the Griffin geometry serves to both dissect and selectively prop up the landscape systems at play. The river is given room to expand and contract, but is edged and hemmed by the circles, lines and axis of the grid.

4.3.2 Performance

This tension between infrastructure and landscape instigated an agenda for this project – to question the site as a place between larger influences (such as the surrounding city structure) and the nature of the institution, where both actively react to the phenomena of the environment.

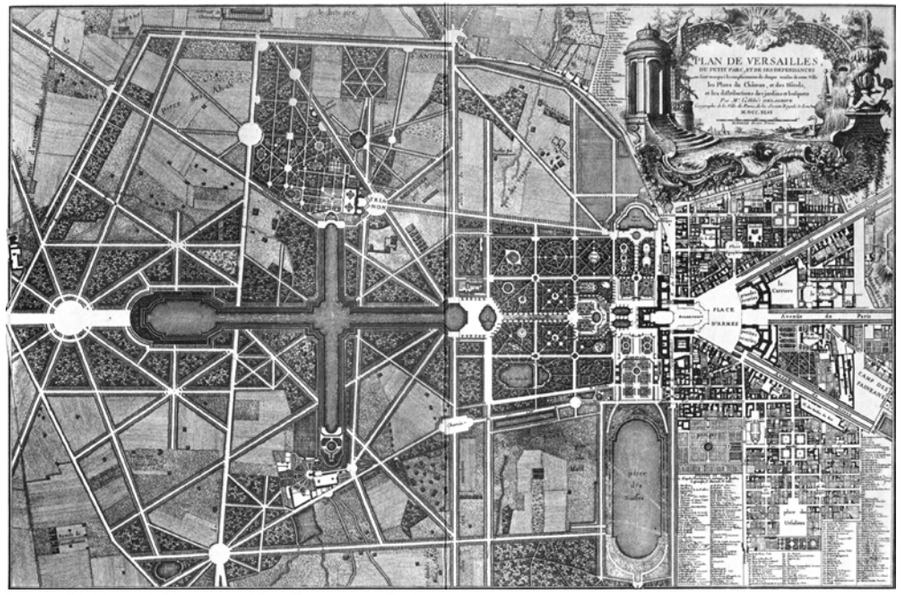


Figure 74. Plan of Versailles, Von Delagrife, 1746

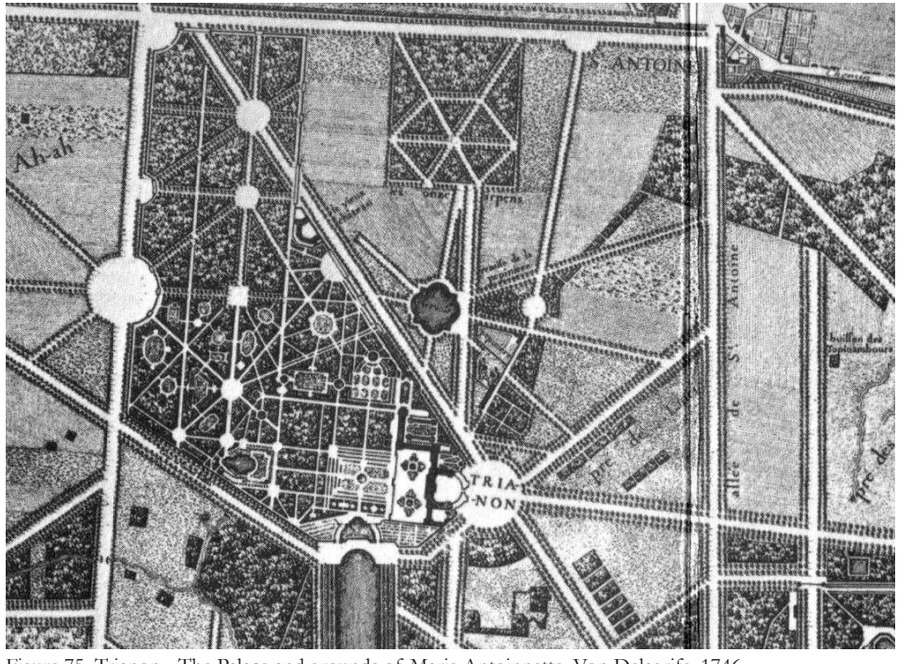


Figure 75. Trianon - The Palace and grounds of Marie Antoinnette, Von Delagrife, 1746

"Wasn't that, in the end, what he wanted? To discover how this place worked—not just its outward system of organization, but its inward, private one as well? Its secret machinations, the strings that gestured the puppet. Who was the puppet, though?" (Edan Lepucki, California)

The environment has tendencies to follow the 'path of least resistance'. To follow its own operational logics. This is in opposition to the mode of the institution, that is, to organise and disseminate knowledge along disciplinary lines. The existing conditions were understood as a series of expressions of movement, remnants and traces of processes occurring through the ground that could be 'read' on the surface. The institution as a model frames the site as an environment within which to circulate and reproduce. In effect, the institution turns the surrounding area into a production plant to make multiple versions of itself. The aim of the geometry as a vector is to circulate to institution; it wants to move, and in doing so transforms its immediate environment. A catalogue of existing conditions indicated the variations in surface and provided a range of processes within which the new faculties could be embedded. Transferring processes to other areas of the site creates a layering and overlapping of existing and new conditions.

The performance of an educational institution is considered as an initiator of the design. The mode of the educational institution has tendencies as an apparatus to organise, classify and disseminate knowledge. It is a mode of production in itself. The landscape is the ground for a reproductive extension of faculty into the environment. The line becomes a vector for the continuous expansion, retreat and contraction of the functions of university. Key elements of the institution – the carpark, the classroom, the service entry – are redistributed across the campus through a vector joining to the Griffin axis in an attempt to amalgamate the functions and forms of the university with the landscape.

In his Potteries Thinkbelt project, Cedric Price uses redundant infrastructure of the ceramic production industry to make a new type of open university, made up of industrial components that were joined at the locus of the rail line. The project suggested a dynamic model for arranging the functions of a university. Restricted by the line, the mobility occurred through movement along the tracks, an expansion of a 'mobile' library along a set route. This project was informative in the way of thinking about the possibility distribution of a campus over a large area. The generating faculties project differs to Price's project in the ambition to have movement, and to truly incorporate change through the uncontrollable integration of landscape changes and performances. In this way the production of the university is a collaboration between institution and environment. Life and death, birth and decline can all occur through this structure.

Cities arise from the flow of matter-energy, but once a town's mineral infrastructure has emerged, it reacts to those flows, creating a new set of constraints that either intensifies or inhibits them. Needless to say, the walls, monumental buildings, streets, and houses of a town would make a rather weak set of constraints if they operated

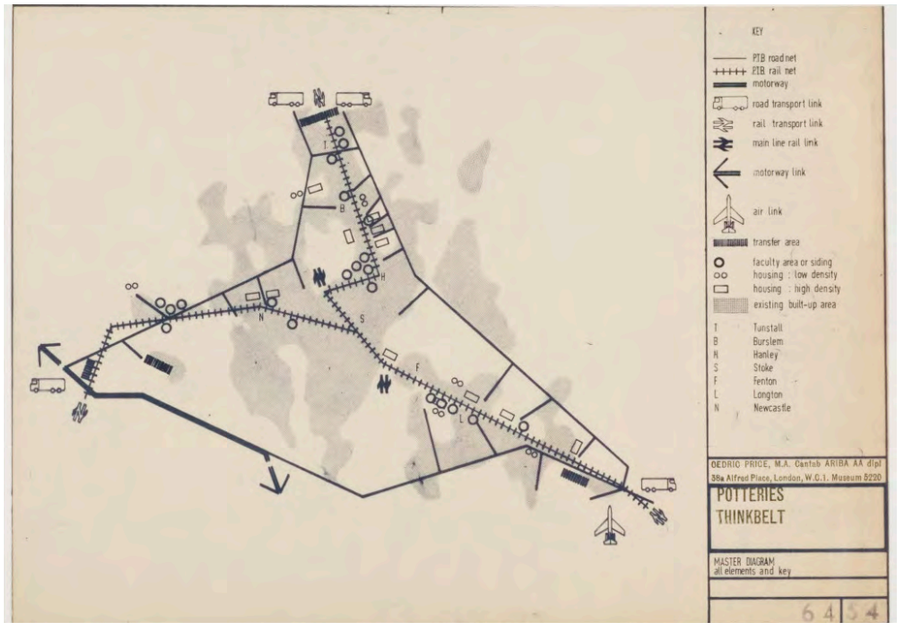


Figure 76. Connections. Potteries Thinkbelt, Cedric Price 1964.
Courtesy of the Canadian Centre for Architecture, Montreal

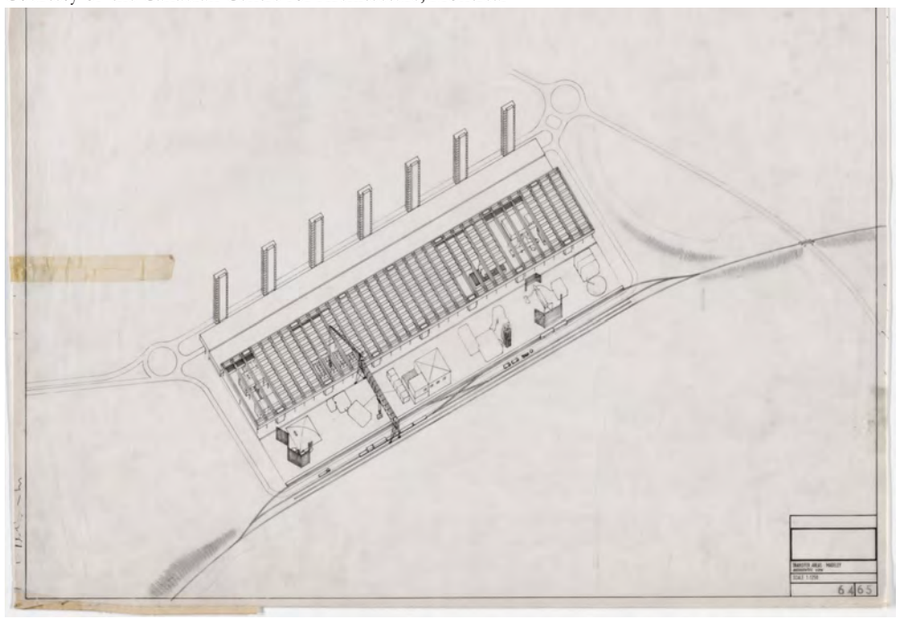


Figure 77. Unit. Potteries Thinkbelt, Cedric Price 1964.
Courtesy of the Canadian Centre for Architecture, Montreal

on their own. Of course they do not. Our historical exploration of urban dynamics must therefore include an analysis of the institutions that inhabit cities, whether the bureaucracies that run them or the markets that animate them. (DeLanda, 1997)

Another key influence on the thinking of this project was OMA's project Tree City. The project was the winning entry for the Downsview park competition in Toronto. The scheme, proposed an open strategy for the park. The scheme sought to provide an open framework through the planting of vegetation in clusters. The stated ambition was to be 'purely administrative in function', repositioned the role of design into a form of communication. Where the role of the designer was to embed the production of design into administrative or 'distributed' networks. This design engages with the civic apparatus of the city as a means of producing 'landscape'. The formal agency is embedded in, and activated by, the civic body that administers it. However, examinations of the project post inception indicate that the end product of the Park did not equal the complexity of the design framework. The planting occurred, but did not catalyse programs, and further developments to more fully meet the requirements of a park. The open framework was too open. The agency of design was lost to ubiquitous procedures of administration and maintenance found in the management of any park. The introduction of infrastructure as a catalysing and organising element in the Canberra project sought to set processes of change in motion, rather than waiting for them to spontaneously emerge. This created a tenuous tension between control and freedom where the environment too shifts from background information to something that actively reconfigures the constraints.

So the environment is seen as crucial insofar as it introduces disruptions to the model of the university. It provides a context within which the model is deployed or employed. Usually the aim is to limit its influence. For example, the Wardian case, an early form of climate control, was developed in the 18th Century to enable the transport of plant material (somewhat ironically to less suitable climates for growth). The environment forces a development of variations. It may be incorporated only as data but is in no way inert in the process.

Proposing the introduction of environment as alternative contexts, gaps between the logics of types, can on the one hand incorporate outside material and on the other be in continual movement, allowing shifting between.

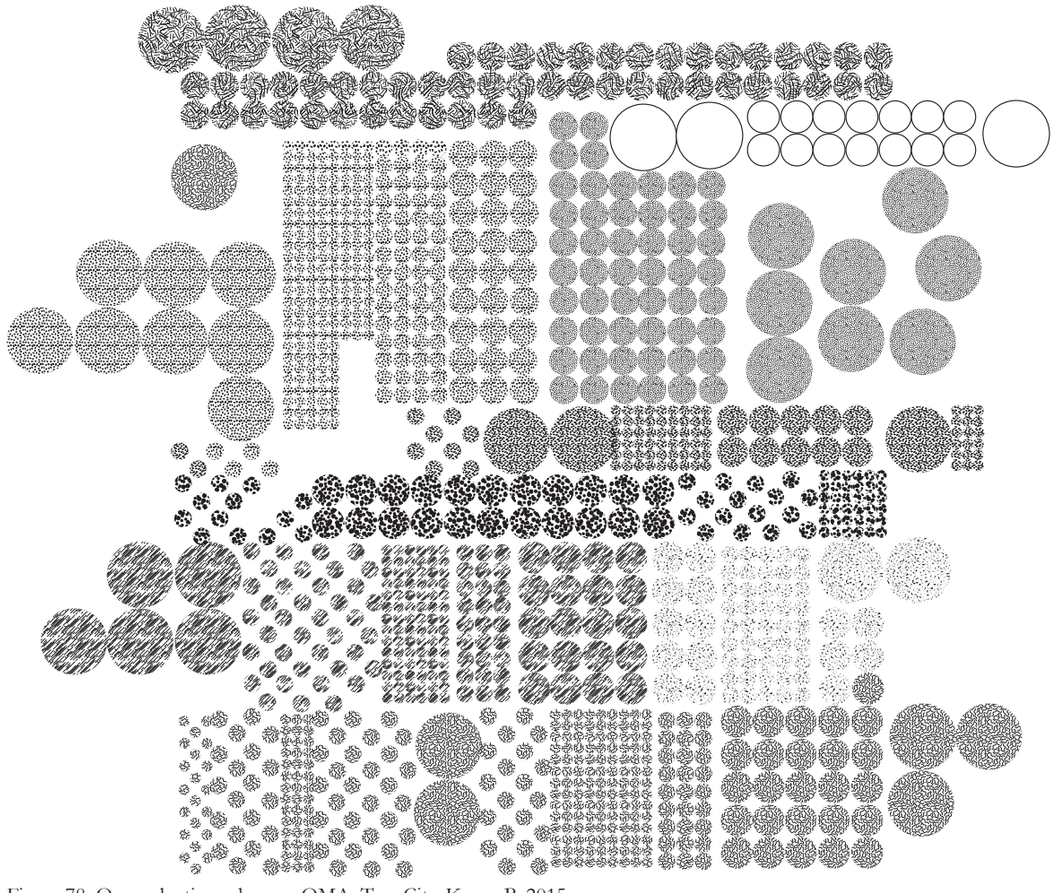


Figure 78. Open planting scheme - OMA. Tree City. Keane B, 2015.

4.3.3 Rescaling

This shifting is mediated by the Griffin axis as a mechanism of transferral – moving geometrical information up and outwards towards the campus. At this point, though, the line is merely a vector for dispersing and recombining the spatiality of the institution.

The existing conditions were understood as a series of expressions of movement, remnants and traces of processes occurring through the ground that could be 'read' on the surface. The virus as a model frames the site as an environment within which to circulate. Self-replicating, a virus uses elements from its environment to reproduce itself, in effect turning the surrounding area into a production plant to make multiple versions of itself. The aim of the virus is to circulate; it wants to move and in doing so transforms its immediate environment. A catalogue of existing conditions indicated the variations in surface and provided a range of processes to drive the virus.

4.3.4 Conclusion – Projection

This laboratory is concerned with the relationship between organising frameworks that are applied in the form of geometries and the environment in which they are applied. The projected plan is concerned with its own operational logics and agency (grids and orders). The environment is pure performance.

Through inflecting the geometry onto the site as a set of behaviours for generating space, the project renegotiates the idea of the faculty. Creating instability by generated a self-perpetuating design that is constantly evolving. The campus acts like a virus, transforming and being transformed by its environment. In this case instability was not produced as the framework overwhelmed the environment.

A virus enters an organism; its aim is not to destroy. Rather, the objective is to utilise the body and its processes as a host. In this way the virus lives forever, as information that enables replication and transmission. The virus itself is not much more than a code, a series of instructions that unfold and react within the confines of the body.

So in this case landscape was subject to the institutional gaze, not an agent of it. The distribution of the elements of the institution was guided by the landscape, inflecting their placement, orientation and scales. But the landscape disappears beneath the onslaught. There is only projection, not inflection. The act of inflecting through the geometry that works in the Griffin scheme – supporting an armature for landscape – becomes an inflection on to the education forms, rather than performances. It is the object rather than the system that is superimposed.

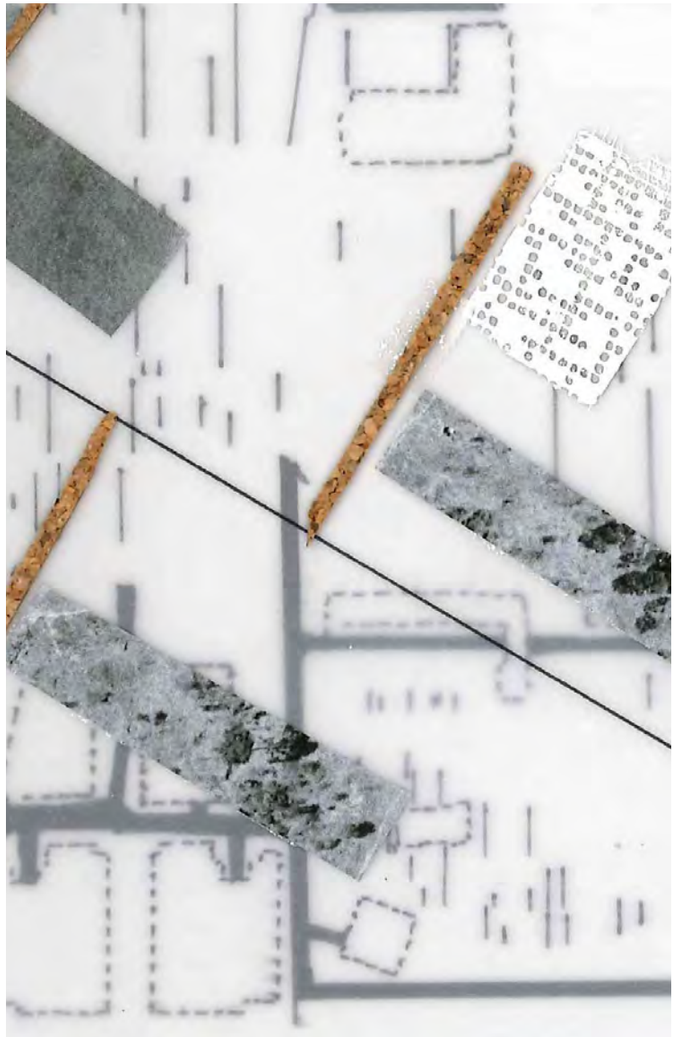


Figure 79. Canberra University, New Faculties overlay. Keane, B. 2014

However, the Canberra University project did indicate a way to sidestep the ubiquity of 'application' through making a series of associations rather than procedures. Despite its limitations, it was an incorporation of the institution into the environment and vice versa, indicating a development of generative models for producing landscape as collaboration between the landscape and the frame of reference. It was thus open to seek, introduce and respond to instabilities.

This series of experiments explores the relationship between organising frameworks that are projected onto the environment in the form of geometries or types.

The experiments traced projections that open up from the static to the multiple. The multiple is seen as a simultaneous projection both from and to the site, enabling multiple logics to emerge. Informing landscape not as a conduit or inert surface, but instead as a medium in forming a larger set of relations. In an evolutionary model, the outcomes are a result of the interaction between two key elements, the internal limits (for example, DNA) and the external – the environment. The environment is key as it introduces instabilities that are also productive, generating movements within singular lifespans and in the development of species over time.

Consequently the notion of the line as a direct figuration of landscape is expanded. The notion evolves from an articulated line as connection, to an axis between moving figures, to a line of omission, then finally coordinating a series of correspondences. Within each work there is a distance between the reference, the connection and the form itself.

These concepts are further explored in the Laboratory for growth (described in the following chapter) in which the role of transformation and growth as embodied within a species (set of behaviours) rather than in geometry. The third laboratory examines the role of the ground and material performance in the ability of the line to convey information.

I have proposed a shift from projection onto to projection through as a means to work between organising framework and environment. Whereby the sets of information from site, framework, line are considered in a constant state of interaction and instability. Importantly this allows an examination, opening up and creative use of the microscopic lens as part of the process of design.

Figure V. Driftus Currenti - Plastic Soup. Keane, B. 2014

5.0 Laboratory 02

The Petri Dish

Overview

The Petri Dish

The previous laboratory proposed a shift from projection *onto* to projection *through* as a means to work between organising framework and environment. A condition where the sets of information from site, framework and line were considered in a constant state of interaction and instability. These concepts are further explored in the Laboratory for growth.

This Laboratory investigates the landscape through the device of the petri dish. This device enables growth by initiating the development of a series of actions that respond to the dynamic environment. Growth occurs through processes of aggregation, accumulation and expansion. A series of experiments considers the production of dynamic form and explores logics of growth. The device provides a limit and medium for growth and variation.

5.1 Laboratory Description

Oversized loosely connected strands of flotation buoys bob along with myriad flotsam within the Pacific Ocean. Partly above the water line, partly submerged, the laboratory is difficult to discern. At the whim of the currents, it is always in movement. To find the laboratory you have to chase its path along the ocean currents.

Attached to a larger series of buoys a makeshift desk occupies a thread of buoys. It is divided into two. At one end is Cassie's desk (Cassandra Lucas, collaborator). Her desk is filled with jars of plastic fragments and a series of rubber ducks retrieved from long journeys drifting in the ocean after falling off a container ship. Next to the specimens are the diagrams of Sergei Eisenstein, and some strange looking models of compressed and stretched space. At the other end, my desk has images of Ernst Haeckel, images of influenza virus, knitting machine patterns, salt crystal formations and an image Darwin's 'tree of life' fluttering in the wind. A neglected Wardian case, its soil surface dry and cracking, is lashed to the edge of the desk.

In between the strands sit a series of the petri dishes filled with species in various states of growth. The hand of the operator is engaged with filling and refilling the petri dishes, adding and subtracting elements from each one.

5.2 Lab report:
Experiments towards growth

Aims/objectives:
The aim of this series of experiments was to test modes of design that could produce dynamic elements within the context of a dynamic system. The works initially responded to a quote from biogeographer Ian G Simmons: ‘The flows of energy and mineral nutrients through an ecosystem manifest themselves as actual animals and plants of a particular species’ (De Landa, 1997). The works posit that these flows could support the emergence and growth of a range of design responses. Consequently, the works consider design as the interweaving of behaviours and interactions to produce expressions through the landscape.

Collaborator:
Cassandra Lucas

Hypothesis:
Designing material behaviours will allow design to emerge as expression of the larger system of interactions, in a reciprocal relation between site and form.

Device:
Petri dish

Method:
Establish inputs and outputs of the larger system through mapping. Set up the conditions and constraints for growth of the small components of the system in the petri dish. Create new forms by designing with material constraints and embedded behaviours that respond and contribute to the environment.

Background:
The following works make up the background for this experiment. They demonstrate a working through ideas of material performance and are accompanied by inquiries into the nature and logic of form. Each work completes a small area of concern that comes together in the larger project – Plastic Soup.

Transformative surface was a project in collaboration with OUTr and Grace Tan. Grace brought to the project a series of material investigations that used the Cartesian grid as a means to produce material variations. Ideas of flux and dynamics came with OUTr.

The site of a light well in Curtin House, Swanston St, Melbourne forms a petri dish. The petri dish is the place in which the local conditions are registered and amplified through the nets. The approach was simple: cylindrical nets were suspended and held open with circular hoops that were spaced at irregular intervals. The containment of the space, overhead suspension, circular hoops and materiality of the net itself were constraints that programmed the behaviour of this ‘surface’.

The performance of the nets is a result of both the material constraints and the environmental conditions. In considering it this way, the individual nets are secondary to the behaviour of the multiple in response to the spatial, environmental and material conditions. The work has a number of continuous, thin surfaces. It is not singular; rather it is made up of processes that are constantly generating a condition of ‘form’ through motion.

The thick threads group, tangle and oscillate with the wind, creating a restlessly shifting form within the constraints of the light well. Recorded through an overlay of film stills, the image captures the repositioning of, and changes in, arrangement of the nets. The image is blurred, uncertain and unstable suggesting that there is no defined form/space. The emphasis is on the variations produced, not the components that make it up.

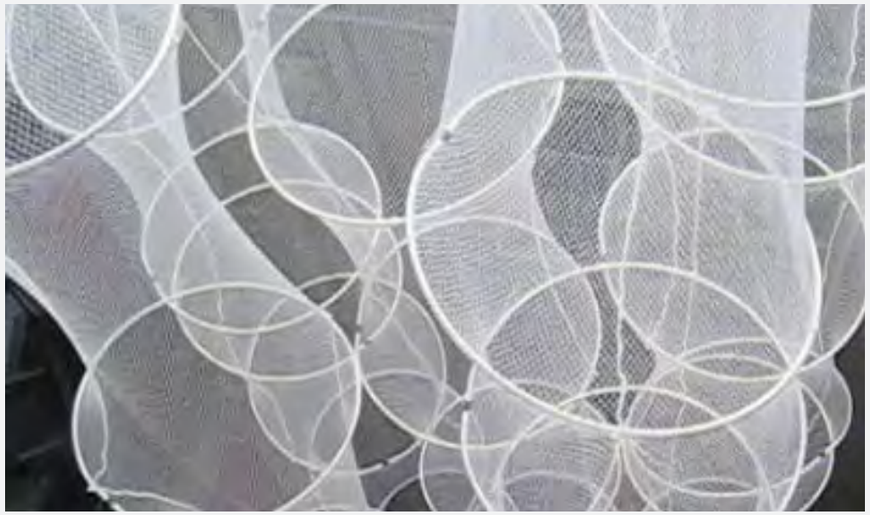


Figure 80. Transformative Surface. Keane, B. 2008.

Figure 81. Transformative Surface - Overlay of 10 film frames. Keane B, 2008.

The distinction between form and performance is further dissolved through images captured by the use of a terrestrial scanner. A 3d dimensional dot matrix of a space in motion was produced. The dots do not differentiate materials or edges. Rather the image traces intensities of movement – the differences produce new, overlapping edges and boundaries.

The work generated a complex set of behaviours – material and spatial gestures that amplified the landscape. However, it somehow remained distant, apart from the landscape. It recorded existing conditions and created movement within the image but stopped short of producing any further movements.

It was important as a way of developing two key ideas – first, the input of the environment into form, and second, the essential nature of constraints for producing variation.

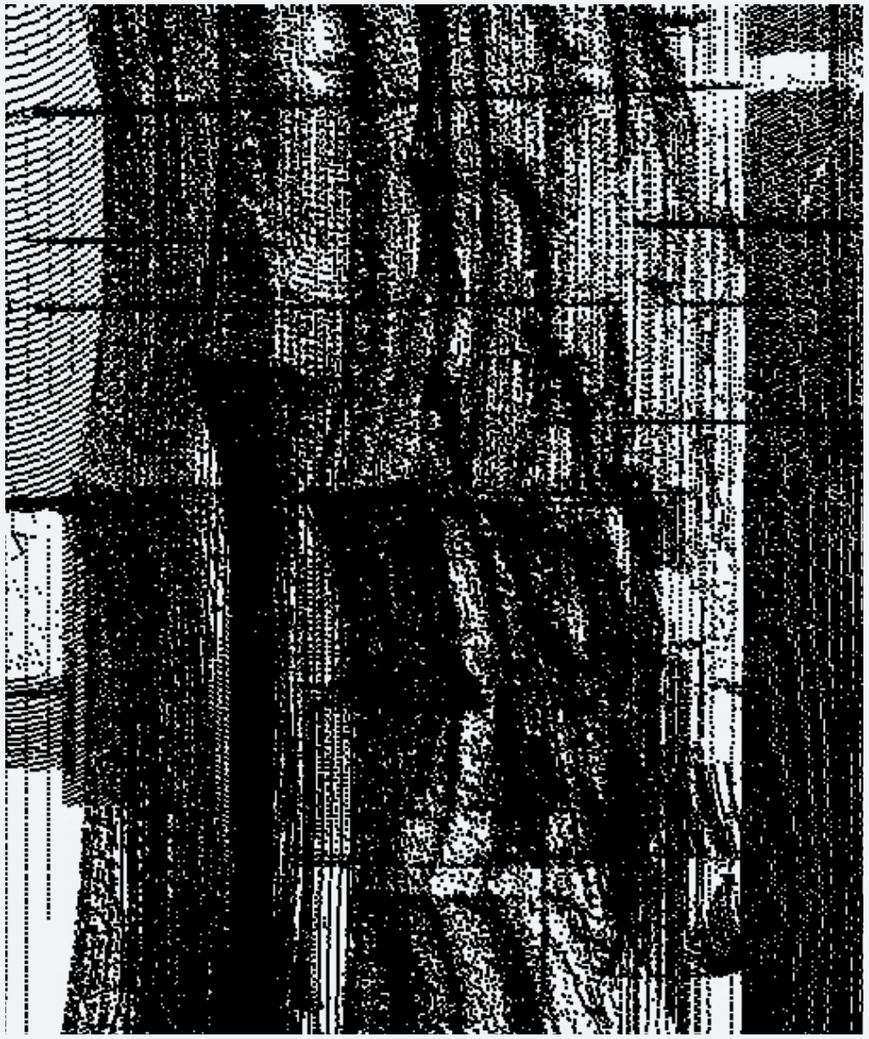


Figure 82. Transformative Surface - terrestrial scan. Afflick G et al. 2008.

A second project was attempted with ‘Growths’, a series for the State of Design festival. The aim was to fabricate in the city an ‘ecology’ made up of physical and digital elements. Small forms were made that linked through QR codes connecting to a series of posters and websites. The forms were made to look like species. They took on different material forms and processes. In this project the petri dish is absent; the growth of the interactions is without a medium.

The faceted forms were carved, made into latex moulds and then cast in plaster. The fabric family was sewn. The pieces were placed in various locations in the city. QR codes were located adjacent to the pieces. The codes linked to an additional piece of information. It could be another site in the CBD, or a website that related to the form or location in the city. The project was interesting in forcing the creation of a series of interactions. However, it was not able to generate an ‘alive’ set of relations

Though the project was unsuccessful in regards to its aims, it did illustrate the importance of the petri dish as a means to controlling scale and types of relationships in attempting to make a dynamic design. The project showed that to truly work within a system, specific interactions of the elements needed to be designed. By generating interactive behaviours rather than superficial connections an ongoing dialogue between the elements could be generated.

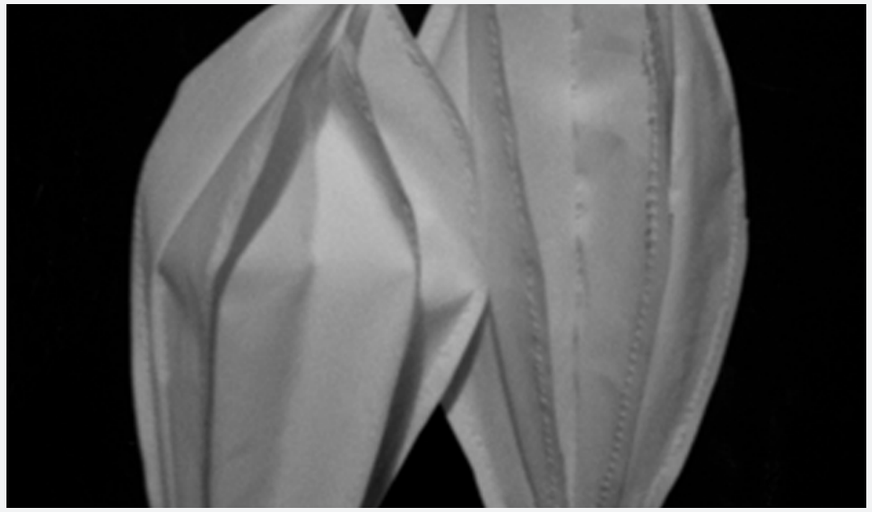


Figure 83. Growths - Fabric forms. Keane, B. 2009.

Figure 84. Growths - Plaster forms. Keane, B. 2009

Figure 85. Growths - In site, Keane, B. 2009.

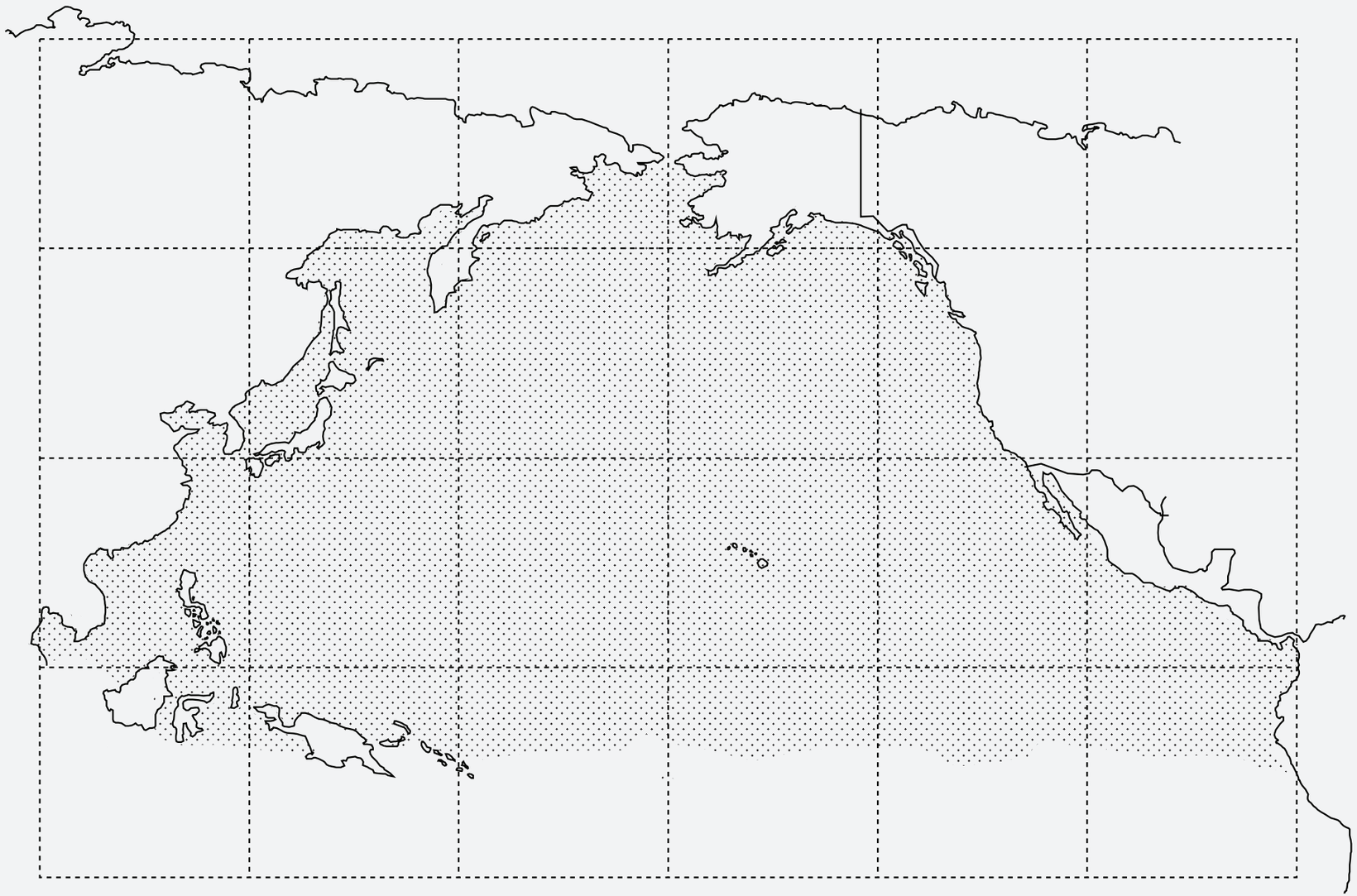


Figure 86. Site Plan - Pacific Ocean. Keane, B. 2008.

Site:
The site for the project Plastic Soup is the Pacific Ocean – in particular the North Pacific Gyre which is occupied by a huge plastic soup of rubbish that has accumulated in this spot due to ocean currents. This project operated at two interacting scales – that of the organism, and the larger system of the ocean. The project proposes a way of relating one set of generated behaviours (the species) that interacts within a larger open system (the ocean), where both scales are seen as fluid. The notion of species is also considered as a fluid definition – a description of performances expressed as physical forms.

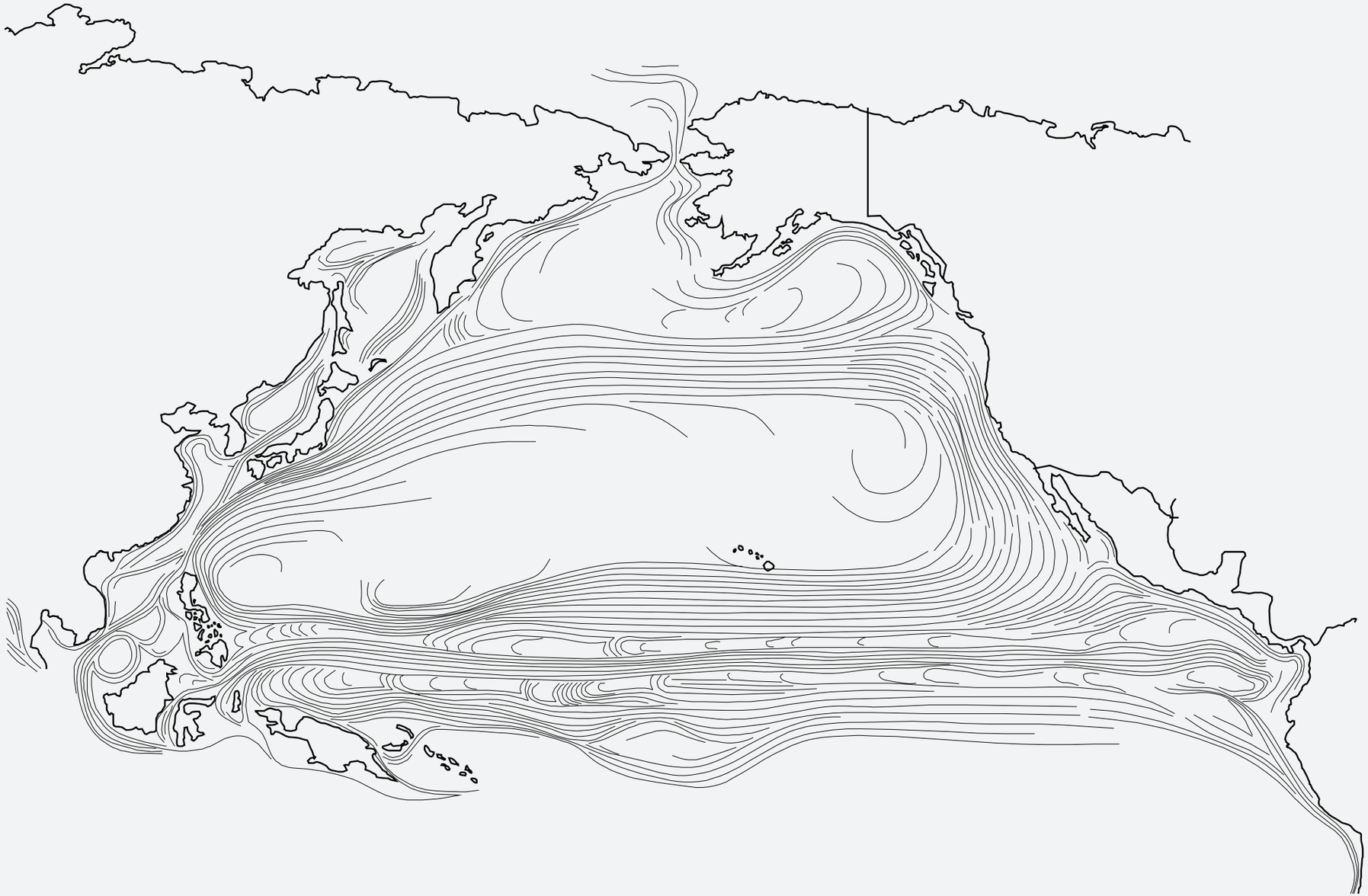


Figure 87. Site Plan - Currents and Drifts, Keane B. 2008.

Process:
Firstly, the Pacific Ocean was investigated. Consisting of adjacent landmasses, various currents and ‘deep sea conveyor belts’, the ocean is a complex set of interacting forces. These forces were mapped. These mappings showed the formation of the rubbish in the Gyre as a physical manifestation of these various processes.

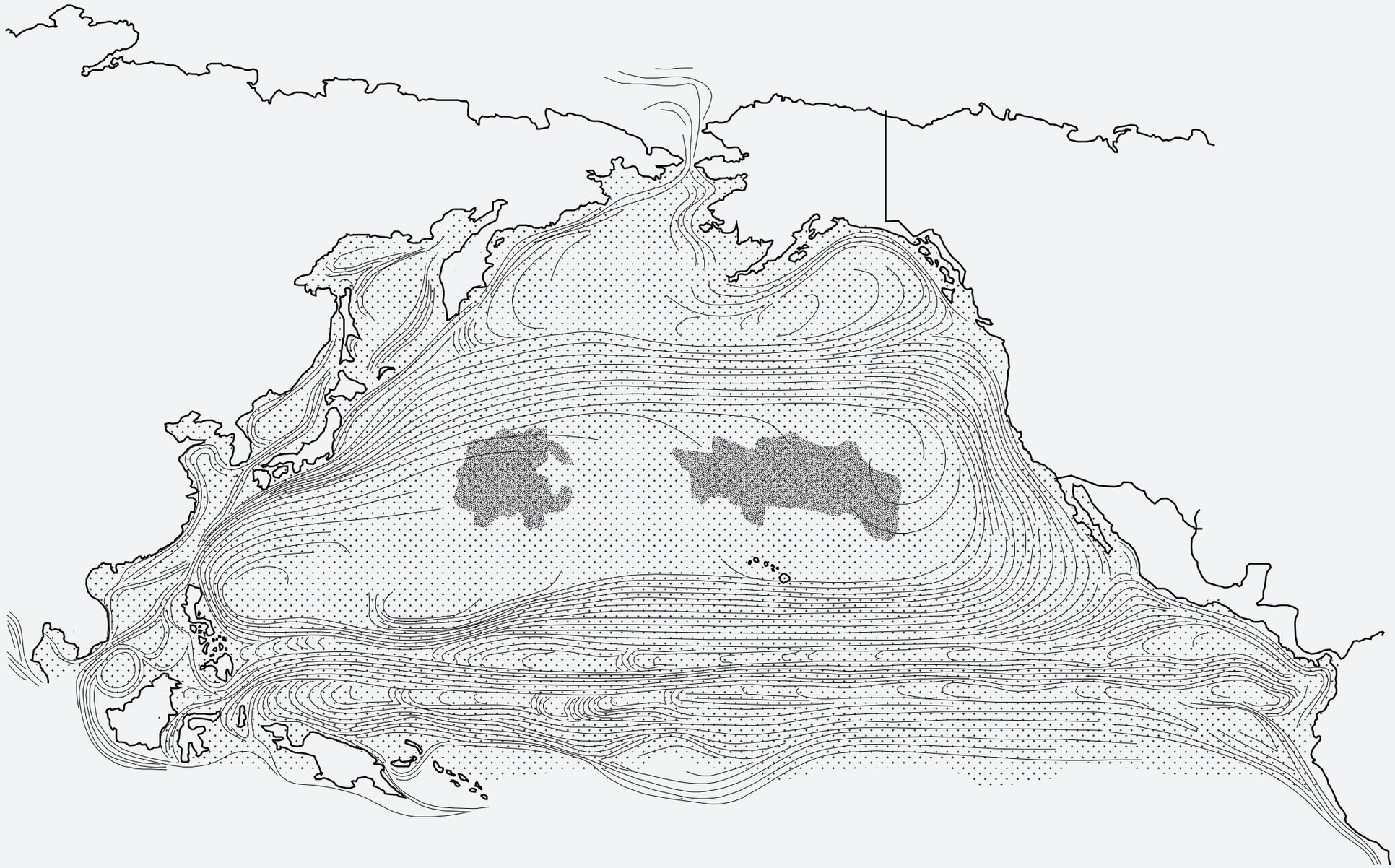


Figure 88. Site Plan - Gyres and garbage. Keane, B. 2008.

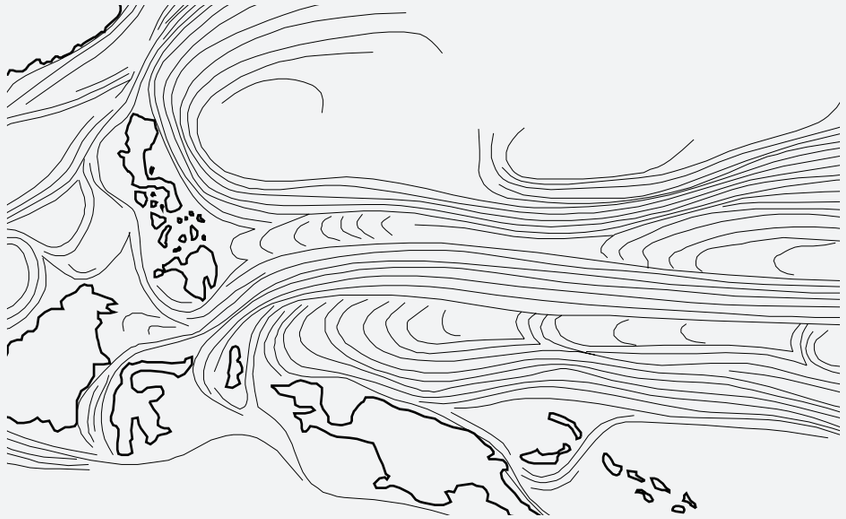


Figure 89. Turbulence, Pacific Ocean. Keane, B. 2014.

Figure 90. Turbulence, Yarra River. Keane, B. 2014.

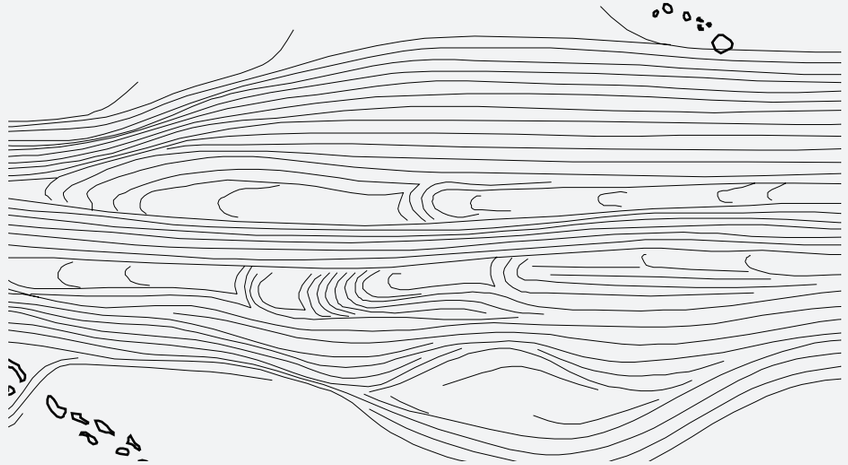


Figure 91. Eddies, Pacific Ocean. Keane, B. 2014.

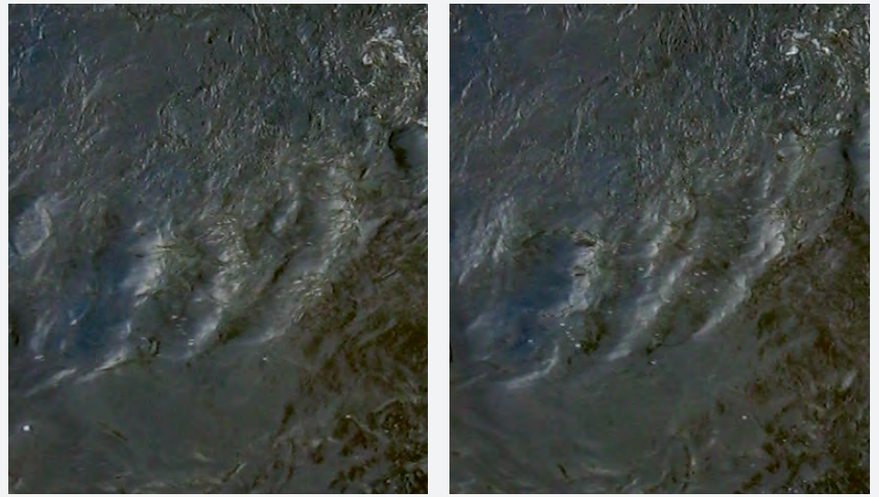


Figure 92. Eddies, Yarra River. Keane, B. 2014.

The rubbish released from the landmasses and collected in the Gyre serves to highlight the scale and action of these movements. A photographic study of water movements serves to consider an analogous condition, albeit at a vastly different scale. The movements, collections and disturbances on the surface reflect much larger processes at work.

Next, the work of Ernst Haekel inspired the exploration of three-dimensional forms that had embedded behaviours. Considering the possible infinite scope of the project, three was determined as the optimum number to consider scales of action that went from slow to fast, hardest to softest. The material and behaviours informed the structure and form of the species.

The decision was made to have the species defined by their own agency, to design their behaviour through form. This was done as a counterpoint to contemporary design works that tended towards the use of biological analogies for the development of static forms. Three species were produced, each with embedded behaviours, input types and interactions.

Terra plasticus.sp is the slowest of all the species. It is a consumer, trapping small scale plastic debris after its release from either the North American or Japanese landmass. As the volume of waste increases, the species begins to move more slowly, eventually beaching itself on an available volcanic shelf (commonly north of Hawaii). This movement and eventual stasis means the species is an ideal investment property. The investment (an island) comes to full term over 5-10 years and is tracked through GPS technology. It can be accessed via boat, seaplane or as a port for cruise ship docking.

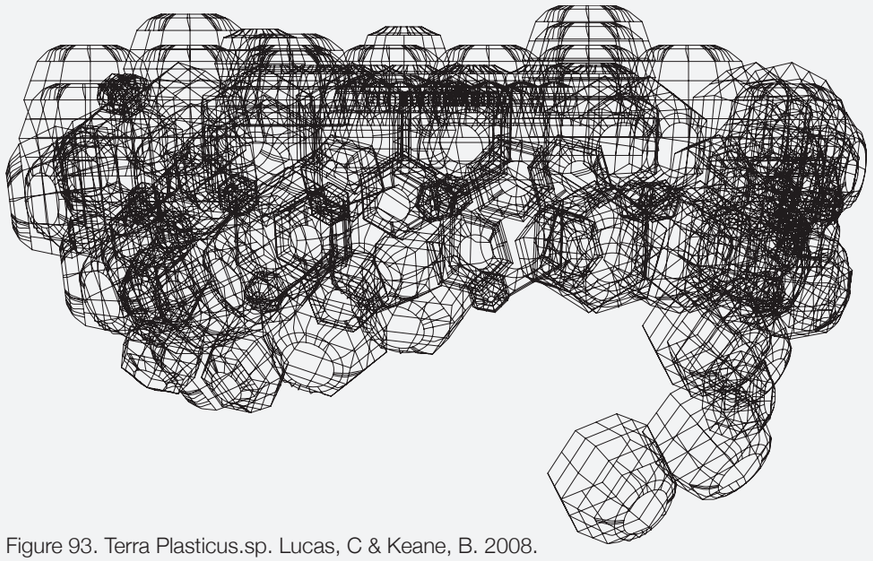


Figure 93. Terra Plasticus.sp. Lucas, C & Keane, B. 2008.

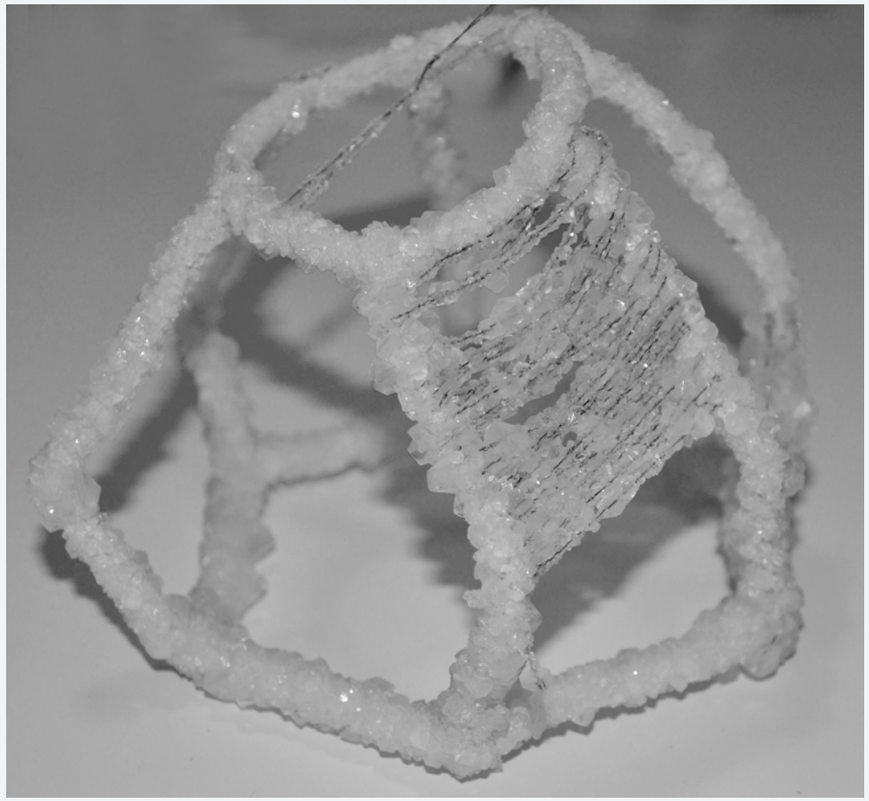


Figure 94. Terra Plasticus salt encrustation - providing rigidity. Keane, B. 2014.

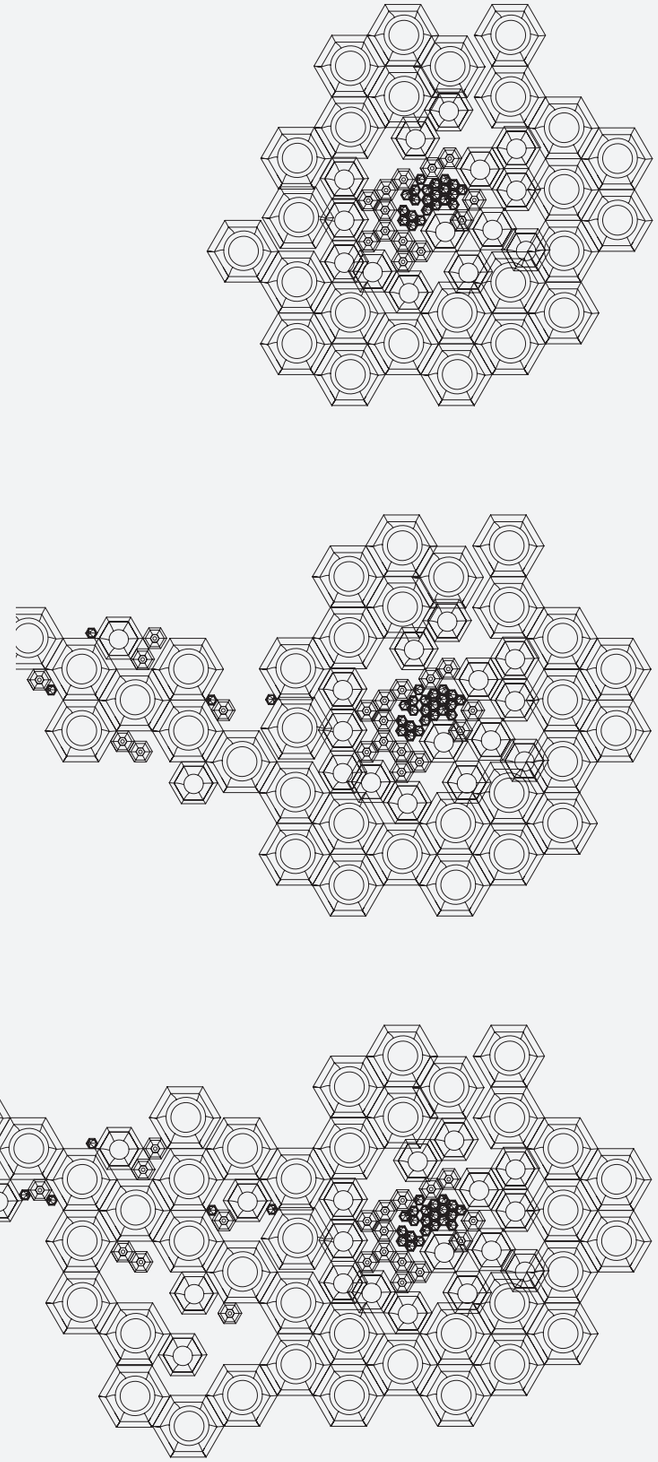


Figure 95. Terra Plasticus accumulation pattern. Lucas, C & Keane, B. 2008

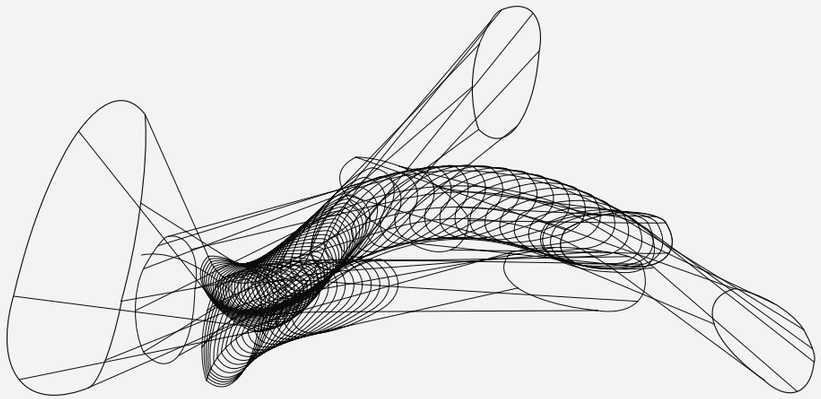


Figure 96. Minutis dispersus.sp. Lucas, C & Keane, B. 2008.

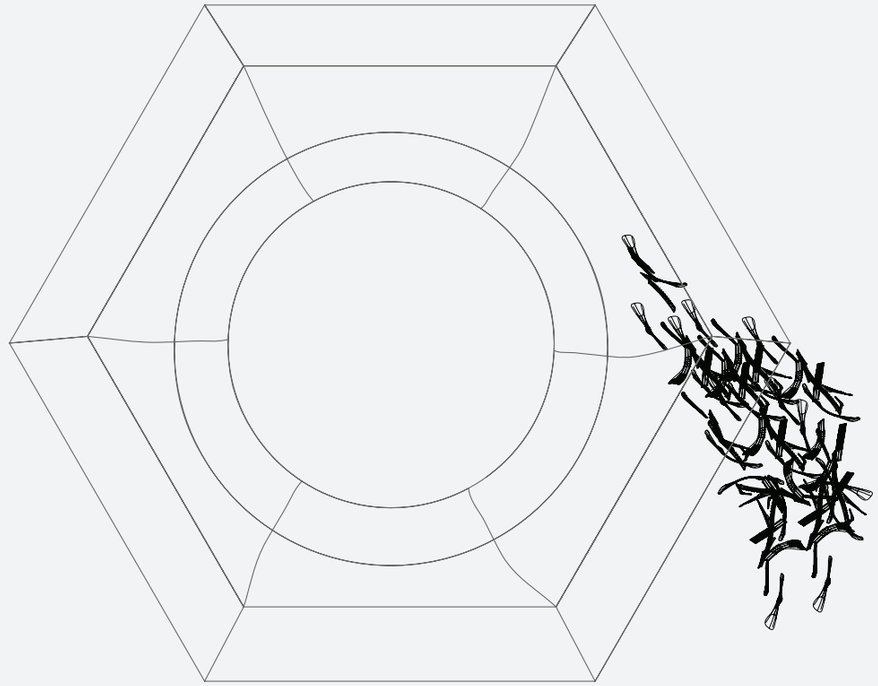


Figure 97. Minutis dispersus and Terra Plasticus - mutual attachment. Lucas, C & Keane, B. 2008

Minutis dispersus.sp is a nomadic, epiphytic species, inhabiting the top layer of the ocean. Shifting with ocean currents over time, it will find a host species and attach. It is a producer, but the most fragile of the species due to its small size (each arm is approximately 10mm) and short lifespan of one year. It has a permeable membrane made up of many small components and can grow to 1m in size. Seeded with nutrients that attract phytoplankton, it provides the first link in the oceanic food chain by feeding on Phytoplankton.

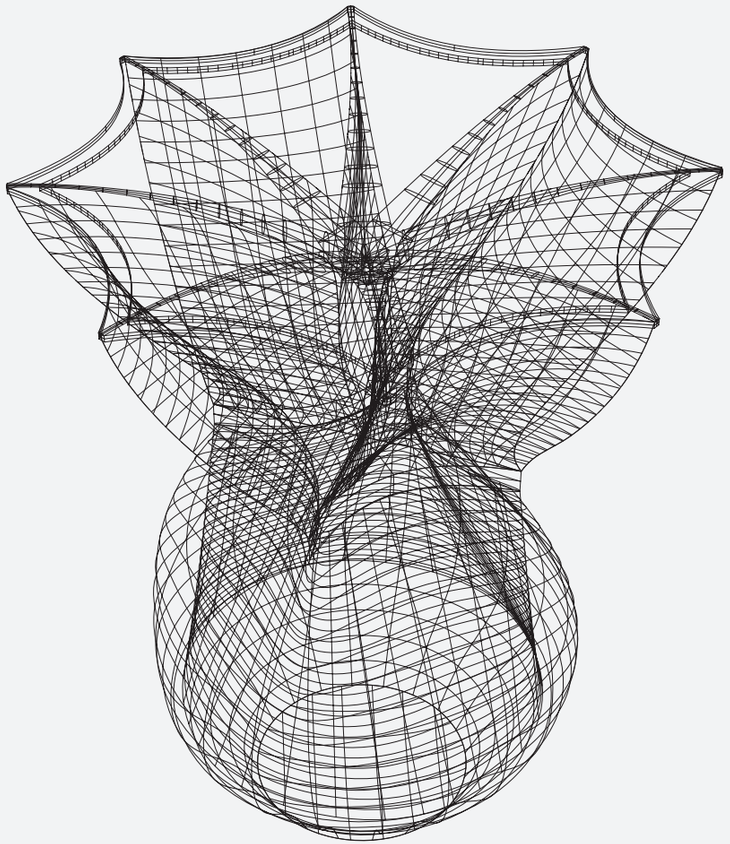


Figure 98. Driftus currenti.sp. Lucas, C & Keane, B. 2008.

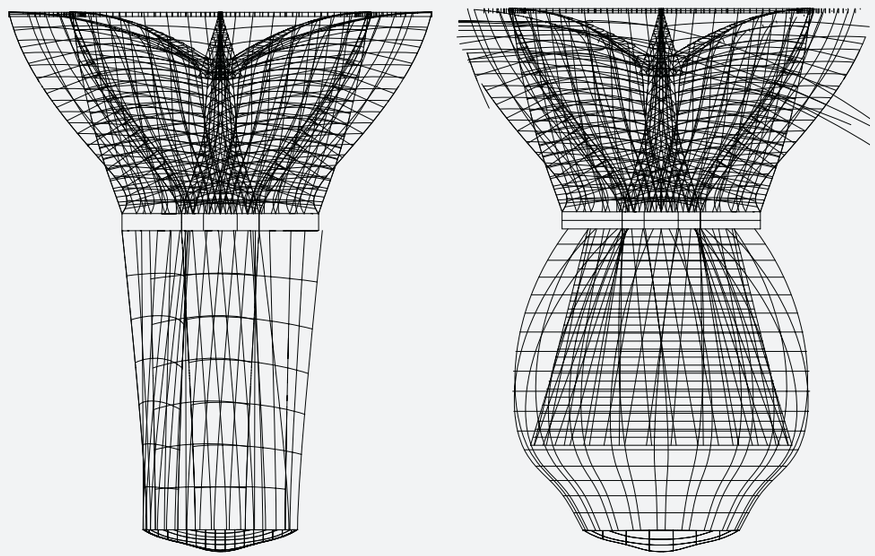


Figure 99. Driftus currenti - expansion. Lucas, C & Keane, B. 2008.

Driftus currenti.sp Is a recycler. It gathers larger sized plastic units (for example, plastic barrels, bottles, fishing equipment). Its lower membrane swells to accommodate large amounts of waste, using the ocean currents to move through the ocean and eventually to a recycling station, where it is emptied and released back into the wild. This species is continually drifting throughout the ocean. It can be inhabited as a mobile home or combined with Terra plasticus.

Three species, each with a particular mode of movement and set of behaviours, are ‘released’ into the Gyre. The species act as links that construct new relationships. Cruise ships, fishing and container vessels, tourists and occupants of the Hawaiian Islands are all integrated into the ecosystem. The proliferation of the three species and their interactions resulted in a new industry of plastic collection and subsequent extensions to the system (new ecologies).

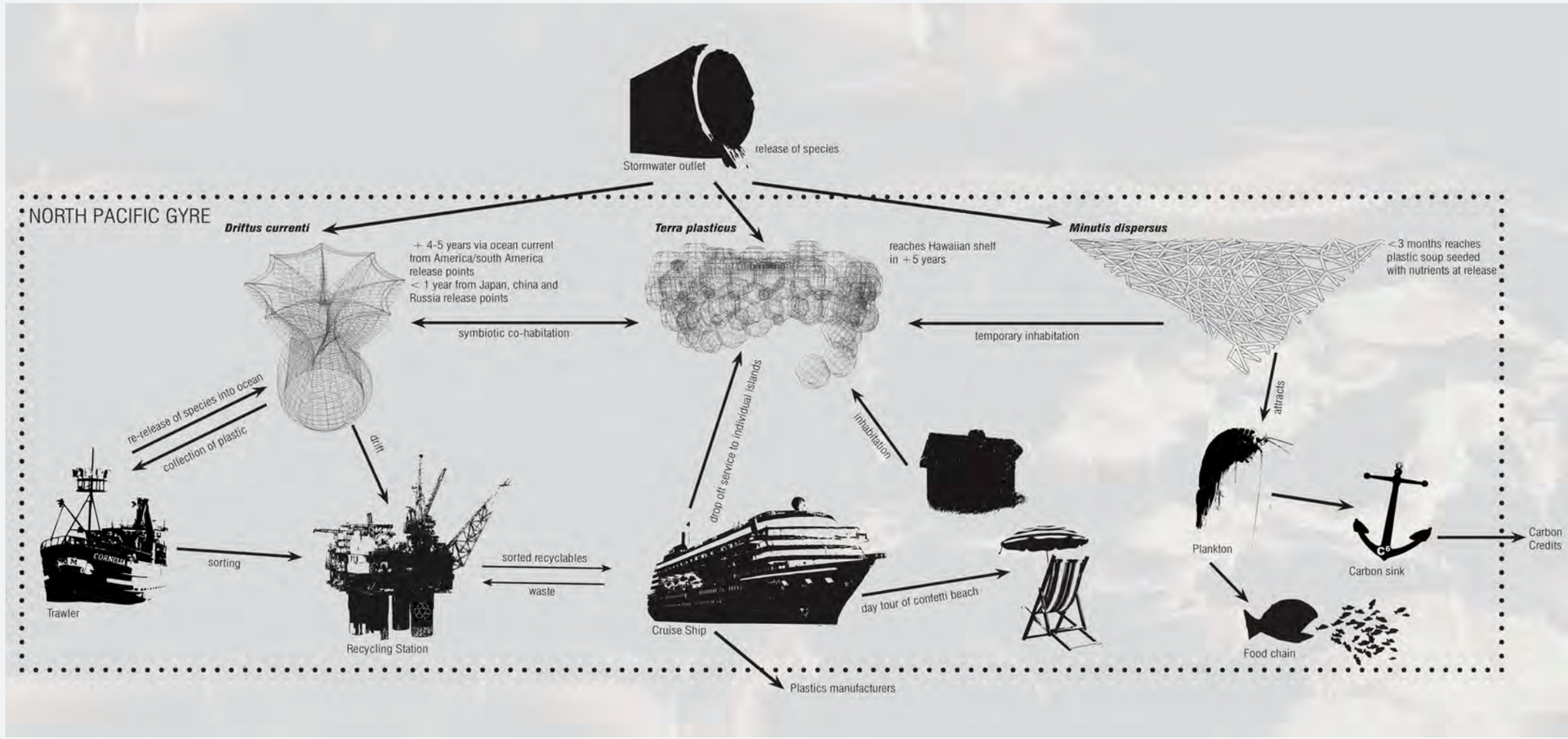


Figure 100. Interaction map. Lucas, C & Keane, B. 2008.

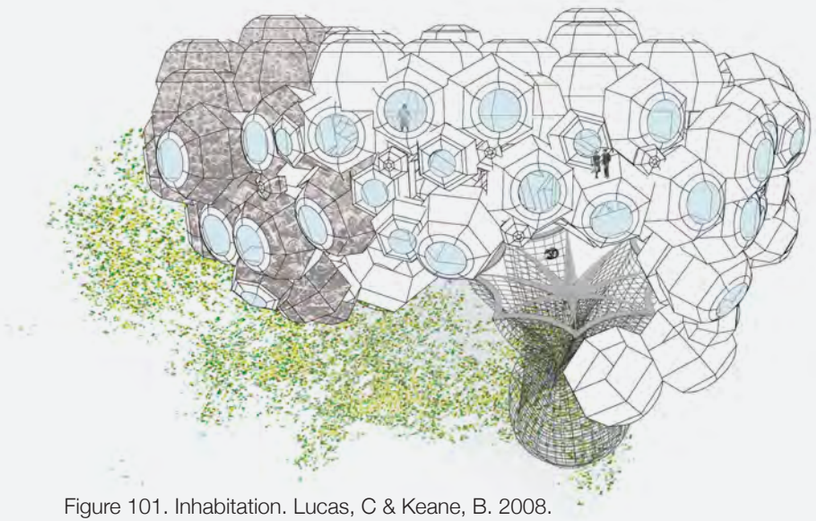


Figure 101. Inhabitation. Lucas, C & Keane, B. 2008.

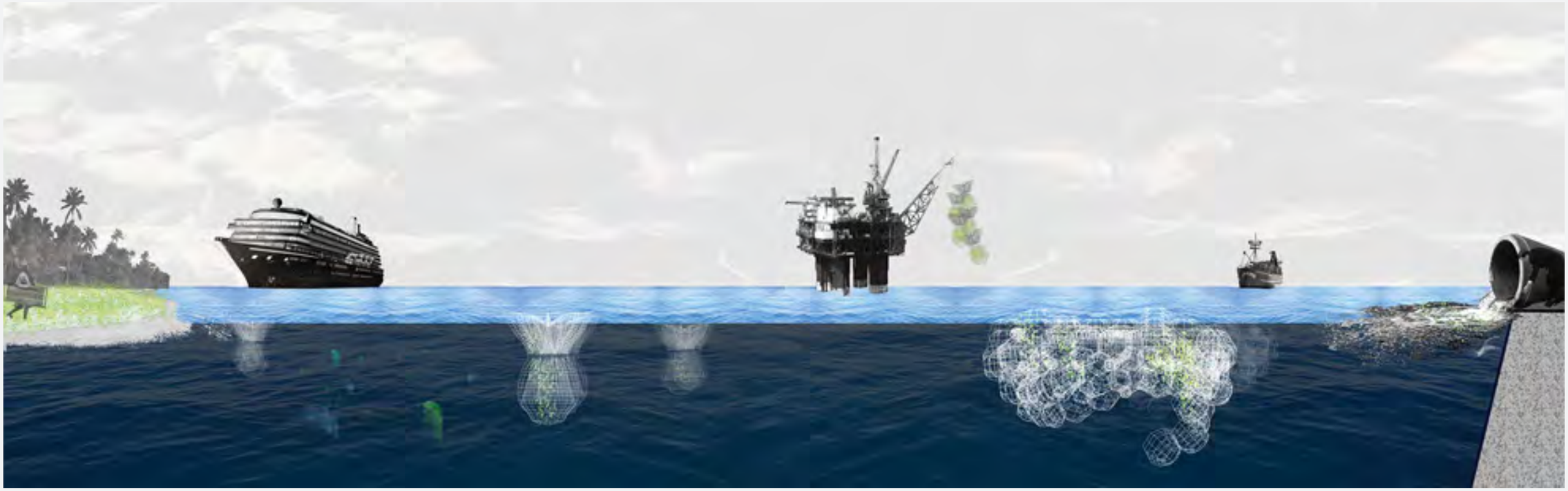


Figure 102. Distribution and Collection. Lucas, C & Keane, B. 2008.

Figure 103. Species off coast of Hawaii. Lucas, C & Keane, B. 2008.

5.3 Discussion

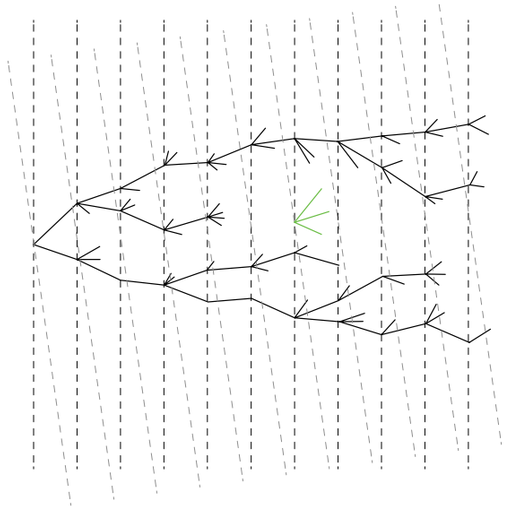


Figure 104. Augmenting Darwin's tree of life.
Keane, B. 2014.

In these projects the aim was to produce growth, change and proliferation. In this section this agenda is situated within the larger discourse of Landscape Architecture and discussed as a series of acts that relate to notions of systems, change, growth and dissolving.

5.3.1 Systems

Systems in landscape architecture have been a means to understanding dynamic relationships. Over the last 30 years there has been recognisable shift from a focus on environmental relations to one that incorporates ecological, cultural, economic and other influences. The seminal work of Ian McHarg is a jumping off point for the framing of system in Landscape Architecture which draws an environment, categorising and typing relations between parts at a large scale. McHarg was followed by James Corner, among others, who generated form through operationalising ecological dynamics.

Extending the notion of ecology to include the designer, this Laboratory questions how to work in a state of 'always being within' the system – where what is inside and what is outside is not so clearly defined. The position is an adjustment to the notion of ecology from a description or metaphor to one that opens up the design act as one that engages with and alters the system within which the design 'lives'. Ideas of structuring, active limits and reciprocity with the environment propose means to address

an ongoing concern with how to consider the production of form in landscape architecture. As a result, models of growth and change through the lens of ecology are enacted – as a series of petri dishes.

> The North Pacific Gyre is the location of a giant collection of plastic – an aggregated plastic soup formed by the movement of ocean currents. Plastic discarded from the landmasses on either side of the ocean collects, collides, breaks into small pieces and floats in patches. Constantly in movement, the plastic becomes part of the ecosystem. It takes the place of sand, replenishing beaches in Hawaii. It is eaten by wildlife, washed up and again returns to the patch.

The plastic cannot be separated from the ocean due to the small sizes of the pieces, and the sheer volume of water. Biogeographer Ian G Simmons wrote that 'The flows of energy and mineral nutrients through an ecosystem manifest themselves as actual animals and plants of a particular species' (De Landa, 1997). This quote initiated a series of ideas about how the project – Plastic Soup – could develop ways of integrating the designer into an ecological system, not as an observer or problem solver, but as a generator of organisms and relationships. At one scale, the designer curates the attributes, connections and interactions between the species. At the same time, the designer makes the form as a physical expression of the behavior of the species, allowing growth, variation and production through the interaction of the species and the environments.

Operating at multiple scales simultaneously, this laboratory works between two scales in considering systems – the organism and the ecology – in order to generate alternative ways to work within systems through dissolving the distinctions between the two. Species see only the form and operation of the species as single entity (the formal and behavioural characteristics of which can be described). On the other hand, ecology sees only relationships, connections and groups that are without defined forms.

By dissolving the distinction between species and ecology a connection and reliance is made between the growth of the individual species and their ecological characteristics. Those characteristics are expressed through the species into landscape through the collection of material. Instability in this case is the expression between the species and the environment that enables growth at multiple scales.

> *Steve McQueen's 'Bear' (1996)*
> *In this work of film, two men 'wrestle'. The feints, grappling, steps and missteps of the two 'protagonists' continually shift and define the extents of the space while the emotions that are registered*

Figure 105. Wardian Case.
The Gardeners' Chronicle and Agricultural Gazette. 1856.

on the faces of the participants shift the meaning and interpretation of what that space might be, although it is never fully revealed to us.

Here the action itself defines and describes the space, not as a static entity, but space in continual instability or negotiation with those who inhabit it. This is much like the game of street cricket that redefines the familiar elements of the street (kerbs, road lines, front yards) into stumps, boundary lines (for 4 and 6) and fielding zones. In *Bear*, the deliberate focus on the bodies of the players allows few contextual references to be made. There seems to be no room or world beyond the performance. The room does not 'set the scene'. The scene constructs the space. The performance itself is the making and remaking of space. This reciprocal relationship between performance and space is investigated through the petri dish, inviting discussion about larger systems and relationships.

The laboratory, in its undefined nature, questions how to work in a state of 'always within' the system, where what is inside and what is outside is not so clearly defined. Floating in the soup.

The key project – Plastic Soup – addresses questions of dynamism and the production of form. It works from a simple first premise: what if the outputs of human actions are reconsidered as inputs into the system? What new forms and types of connections could emerge as a result? How could the design act form a reciprocal relationship between the environment and the design act, forming through alteration, addition and accumulations of matter?

5.3.2 Ecologies

In landscape architectural discourse there is some degree of overlap in the use of the terms *ecosystem*, where interactions occur between plants and animal (with an emphasis on living systems), *ecology* (the study of relationships), and the more general term *systems* (incorporating non-living systems). Often they are used interchangeably. This work is most concerned with the more general term 'systems'. It interested in relations between things both living and non-living. However, it is useful to situate the work within an ecological understanding in the discipline.

Though the study of plant material and natural phenomena has long been a part of Landscape Architecture, approaches to designing the environment that were not drawn from painting or gardening first emerged in the late 1960s. Introducing ideas borrowed from ecology, Ian McHarg's seminal text *Design with Nature* was released in 1969. It sought to derive principles relevant to application within Landscape Architecture and planning. Importantly it posited that the ecological was a means to introduce the human into the set of relations rather than to separate them. Categorising and typing relations between parts, McHarg produced drawings at a regional scale. They

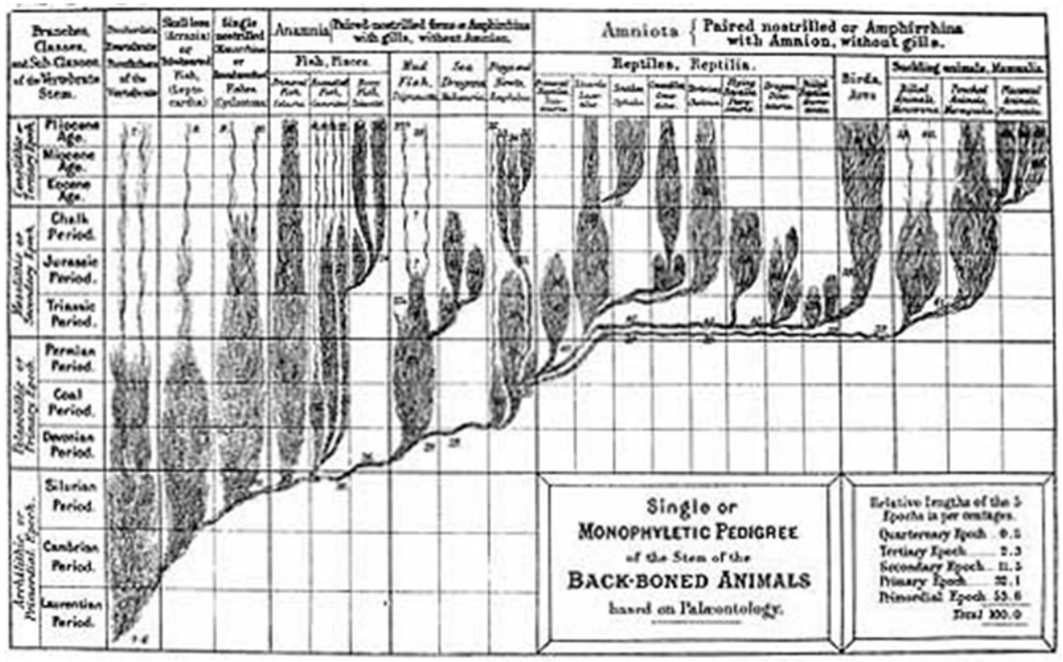


Figure 106. Monophyletic pedigree. Haekel, E. 1880.

were not, and did not intend to be, formally inscribed. The landscape was viewed as data to be translated through the map in such a way as to demonstrate impact and effect change through an at distance application of principles.

A parallel thread in the work was a fascination with biological processes of formation as an expression of their larger environments. The notion of optimal working of the system was framed through 'fitness'. As a result, even though humans are considered in the set of relations their impacts are generally seen to be detrimental to the fitness of the system. Chapters such as the 'City: Health and Pathology' indicate the cause of the disease. Incredibly influential though it was, *Design with Nature* was of its time. Rooted in a static, planning orientated reading of ecology. The most noticeable change in the contemporary understanding of ecology has been a reversal of the importance of stability. For McHarg, creation was associated with 'complexity, diversity, **stability**, a high number of species and low entropy. Reduction and retrogression, in contrast, were associated with simplicity, uniformity, **instability**, a low number of species, independence and high entropy.' (My emphasis).

However, a reversal to this position as a result of a range of discoveries and projections has caused a number of shifts over the last 30 years. The initial shift was as a response to, and integration of, concepts regarding open systems, mostly derived from thermodynamics via the writings of Sanford Kwinter (for the fields of Architecture and Landscape Architecture), and questioning assumptions of stability and equilibrium as optimal. Across this time the framing of ecology drifted towards a more general understanding of interactions and relationships, both organic and artificial.

James Corner, landscape architectural academic, and founder of the influential firm Field Operations (responsible for key projects such as the High Line and the Fresh Kills) neatly side-stepped this dichotomising of human and other biological systems by incorporating ecological, cultural, economic and other influences under the umbrella term of 'systems'. Corner led both an academic and practice based investigation of the ecological, attempting to generate form through processes of ecological dynamics (succession in the instance of Fresh Kills Park).

This duality of the ecological as both a model of thought and also as a scientific mode of enquiry has been at the core of contemporary examinations of ecological systems. *Projective Ecologies* by Chris Reed and Nina-Marie Lister traces a 'slippage of ecology from natural science to cultural lens within and across the disciplines of landscape architecture, urban design and planning' (Reed and Lister, 2014). This is a significant distinction which acknowledges that there are a number of distinct lineages of the ecological in Landscape Architecture. Reed asserts that the applied science and metaphorical lineages to ecology are the most influential. However, both these ways

Figure 107. Fresh Kills phasing. Corner, J. Field Operations. 2001

of considering the ecological neglect to engage material processes into formal strategies beyond the production of the representational strategy.

The difficulty of form-making is addressed by Corner, who states that 'agencies of process become highlighted in ecological thinking, accounting for a particular spatial form as merely a provisional state of matter, on its way to becoming something else. Consequently, apparently incoherent or complex conditions that one might initially mistake as random or chaotic can, in fact, be shown to be highly structured entities that comprise a particular set of geometrical and spatial orders' (Corner, 2006). Corner asserts that the ecological is a way to divine and translate hidden orders of the landscape into the geometrical or representational figures.

The production of form is considered as a transitory state guided by a higher spatial order. The extension to representation strategies over formal agencies causes a fragmentation between framework and action, where the way of conceptualising relationships lacks a responsive instrumentation. There is no frame of reference for the production of form – material performance falling outside of the systematic purview. It may be resolved through a conflation of the model (parametric or otherwise) or technological apparatus and the structuring device or metaphor. Primarily concerned with the redirection, articulation or re-embedded in the current interactions, there seems no room for processes of creative disruption, difference or instability.

The discourse of systems has made an indelible contribution to the discourse within landscape architecture, providing a means to conceptualise process and transformation. However there is a sense that the scientific frame of reference upon which these theories are drawn is assumed to have a way of observing and understanding the system that is inert. That has no bearing on the operation of landscape or through representation, as a result the model becomes either a performative or metaphorical truth. Enter the petri dish as a conceptualisation and activation of the agency of these devices.

5.3.3 Growth and Proliferation

So if the petri dish enables an active relationship between the form and environment, what is the nature of the dish? How does it introduce productive differences that feedback into the formation of landscape? This section considers the petri dish as an active structuring, where structuring is an incorporation of both the logics of organisation/formation and their expression within an environment. Growth and proliferation is generated through a reciprocal relationship between species and environment, where environment does not exclude human outputs. Growth is considered as multi-scalar, operating at a systematic scale and a material scale.

In *Wholeness and Implicate Order,* Bohm, (1981) discusses formative causes. These are types of constraints that act as guides to organise growth. They have a goal but are provisional.

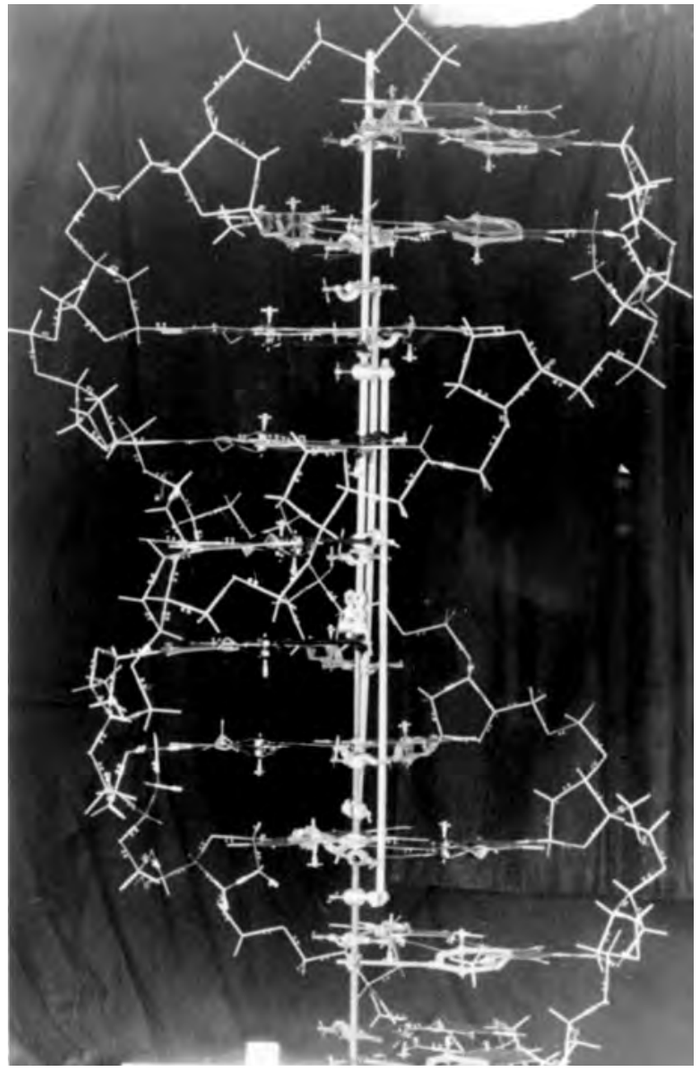


Figure 108. Crick & Watson's. Original DNA demonstration Model. 1953.

In this way, structuring can be seen to have agency and effects, but crucially agency is in a reciprocal relationship within the environment in which its sits (the impossibility of splitting nature and nurture). Structuring as an active and open process allows an awareness of the structuring device as only one of many possible descriptions. The effect and mode of structuring becomes embedded or, more precisely, enacted through the formation of the landscape. A key example of a formative cause is DNA, acting as a means of driving the growth and development of organisms. It is open to mutation, and influence from the organism itself and the environment in which it is located.

As noted above, the nature of the relationship as defined by the structuring reacts to and within the environment. As a result this work is interested more specifically in dissipative systems: those that, according to Kwinter, are 'an open, dynamical system. By "open" one means that it is an evolving system, like a pot of coffee or the local weather, that has energy (information) flowing out of it, and likely into it as well. From where does this energy come and to where does it go? It comes from other systems, both those contiguous to it and those operating within it or upon it: that is, at entirely different scales of action' (Kwinter, S. & Boccioni U. Landscapes of Change. 1992).

So, instability in the system means not necessarily working towards equilibrium. As noted in the previous Laboratory, instability is a productive agent. In the case of Downsview Park, no slippage between the structuring device and the environment (as encompassing, the administrative, the physical, the maintenance) allowed the relationships to become productive or self-generating.

The petri dish has allowed a stitching back together of the root (the biological) and the extension (the ecological), proposing formation as an expression at the intersection of these relationships. Rescaling becomes as an active way to make connections between one set of causes and another, where the biological offers ways of understanding the internal logics that affect physical formation and makeup of organisms, and the ecological is the logic of relations. They are two types of formative causes that operate simultaneously at a range of scales.

Here is a possibility that in working between multiple scales of systems, modes of production could be aligned with the system. An open interpretation allows instabilities produced from the communication, and lapses between multiple systems (at different orders), as disturbances/ feedback loops, without having to necessarily resolve them into a singular model. A discussion of systems as a scale shift allows a teasing out of the constraints (structures), their relations to one another (behaviours) and what they are influenced by (environment/s).

5.3.4 Dissolving: The soup

The Plastic Soup project extends the notion of

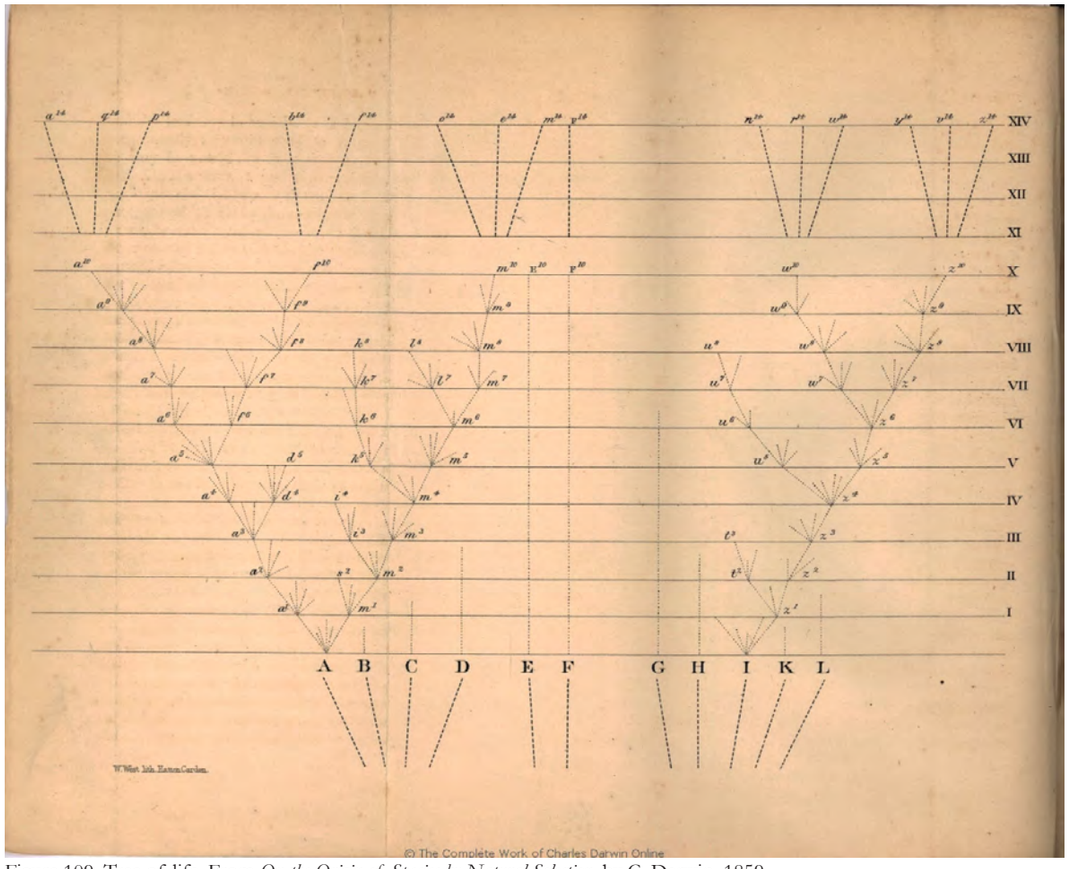


Figure 109. Tree of life. From *On the Origin of Species by Natural Selection*, by C. Darwin, 1859.

energy and nutrients to include the man-made. The work proposes the manifestation of a new set of species that is related to artificial energy/ nutrients. This is a rethinking of conventional notions of ecosystem, that assume a distinction between man/nature, by connecting cultural, biological and economic movements.

The move to make design as analogous to releasing a species allows an elastic definition of site, form and outcome. It is an act of setting in motion where the constraints are performative as well as physical. The web of interactions is constructed to produce beyond itself, a programming of a system. In the case of Plastic Soup, the dynamism of the existing conditions enabled certain performances and interactions. The fluidity of water meant that the species could literally be immersed into the material conditions. What remained unresolved were both the form of the species (notionally driven by performance) and also the relationship to less 'fluid' conditions.

Ecology as a framework allows the development of models of change in relationships. Species as a model of changes in material and transformations of behaviours allows a dynamic way of considering the formation and evolution of multiple scales of matter. The species and soup were a means to working at multiple scales as a means to introduce the 'new' to the system, to consider its formation and development within an environment. An attempt was made to consider the various contexts of the environment (economic) and their expression in the field of the larger site (oil rigs, container ships, tourist vessels), embedding behaviours as a means to design interactions between disparate elements and produce multiple expressions of form. The fictional species became the means to rework relationships. The swirling soup of relations can be presumed but its exact manifestation is unknown. The instability exists as the degree to which the information of the environment – the wind in transformative surface, the garbage in plastic soup – is formative in the species, the physical form.

In this way the petri dish as a device allows a focus on the formative causes relevant to the production of form – without a defined end in mind. It is a particular form of structuring that allows growth and difference, and creates the conditions for a series of interactions rather than a static form.

Figure VI. Multiple Grids - Simpson Desert. Keane, B. 2015

6.0 Laboratory 03

The Grid

Overview

The Grid

Laboratory one explored the integration between projection and environment, laboratory two explored how to create conditions for growth and formation.

This Laboratory extends these ideas by using the grid as a device to consider ground. Geology and Topography as existing forms of knowledge and measure are examined and integrated through the grid, combining the performances of structure and surface. A series of experiments explore the relation between line, measure and material. Within the laboratory a thematic of amalgamation emerges.

6.1 Laboratory Description

At a 0,0 point it begins – a grid of string lines extending out on all sides, emerging like a mirage, a protrusion above the temporary encampment formed by and now delimiting the device. Covering the surface, it perceives topography through its lens. Dust rises between the intervals, confusing even more an ability to find solid ground in the expanse. The lens continuously sweeps the surface, never resting in its search to find the 'real' surface.

An auger is drilling a core. Behind it completed cores form a long line of dashes. Each occurs at the intersection of the string lines. The cores are a material section of the earth, some solid and unified, others crumbling to nothing.

The theodolite oscillates and the auger drills endlessly. An educational kit of ideal, Euclidian forms lies open on the ground next to a field guide spilling its contents. Drawings of Mont Blanc by Viollet le Duc, images of animals drawn in Chauvet cave, and a terrestrial scan of a disused Wardian case, flutter in the wind. The operator stands, another figure within the grid.

The camp will soon move on, leaving no physical trace on the environment, but a growing set of drawings unfold a series of *landscapes*.

6.2 Lab report:
Experiments towards amalgamation

Lab report:
Experiments towards amalgamation

Aims/objectives:

This series of experiments used the device of the ‘grid’ as a way to understand the relation between topography and geology. The experiments test ideas of abstraction – the act of deriving information from a dynamic system (one that changes over time) – and then employ this information as a formal logic through the grid to generate formations of ground. The grid, through drawings and digital and analogue models, is modulated to produce form.

Hypothesis:
That grid can be used to provide a sensitive measure of the landscape. This measure can inscribe new performances and allow the emergence of form. The grid can form a correspondence between the model, the site and form?

Device:
The grid (and the contour).

Method:
Develop a grid (set of lines that measure) to develop alternative metrics of ground. Formulate a new ground through fabrication and modification of a sensitive grid.

Background:
Works were selected as part of this laboratory as they were all preoccupied with the line and testing the ability of the line to embody multiple forms of information. Time, change and expression are explored through the articulation of the line and its relations. The experiments form a lineage of enquiry that was expanded through an specific investigation into the contour.

Redefine

A key point of departure was work undertaken in my final year of Landscape Architecture undergraduate degree when I explored how to modulate the ground. This project was concerned with an expression of the behaviours of the landscape, driven by and emerging through the drawing. The site was a disused quarry and it became a testing ground to choreograph variations and moments through the ground. The objective was not to create a landscape that served a particular function, but rather to consider expression distanced from function.

This project was limited, in the sense that it developed techniques for generating landscape performances, but it was not linked to a larger set of movements or performative outcomes. It indicated a gap for further exploration. The possibility of an integration between the acts of drawing and modelling to engage with material performance to generate multiple outcomes for the landscape.

Figure 110. Niddre Quarry. Keane, B. 2007.

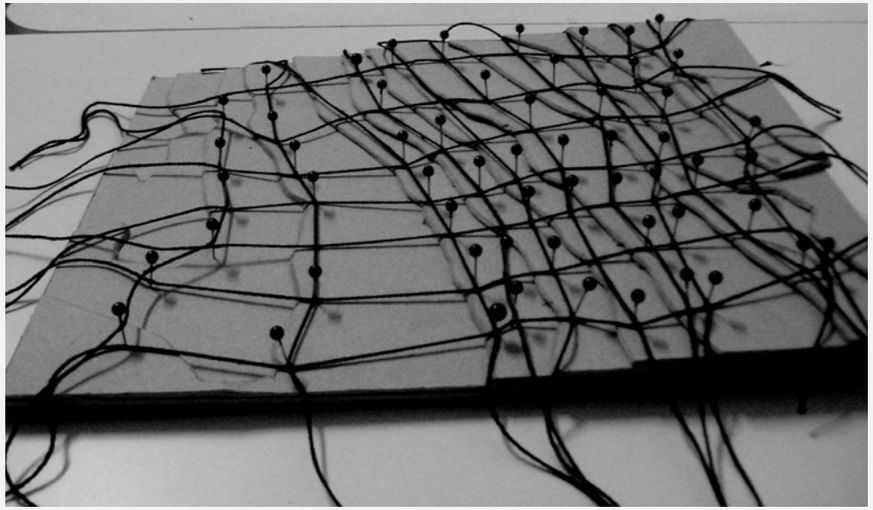


Figure 111. Alternative Contours. Keane, B. 2007.

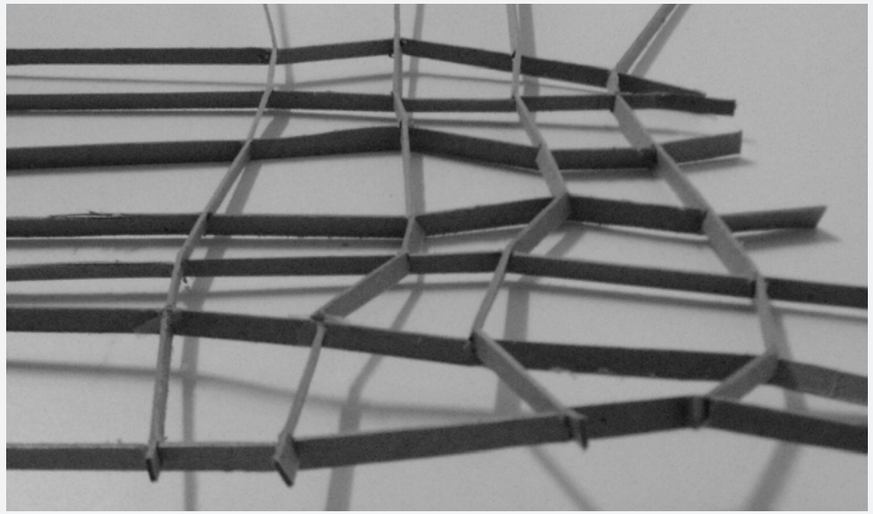


Figure 112. Grid as structure. Keane, B. 2007.

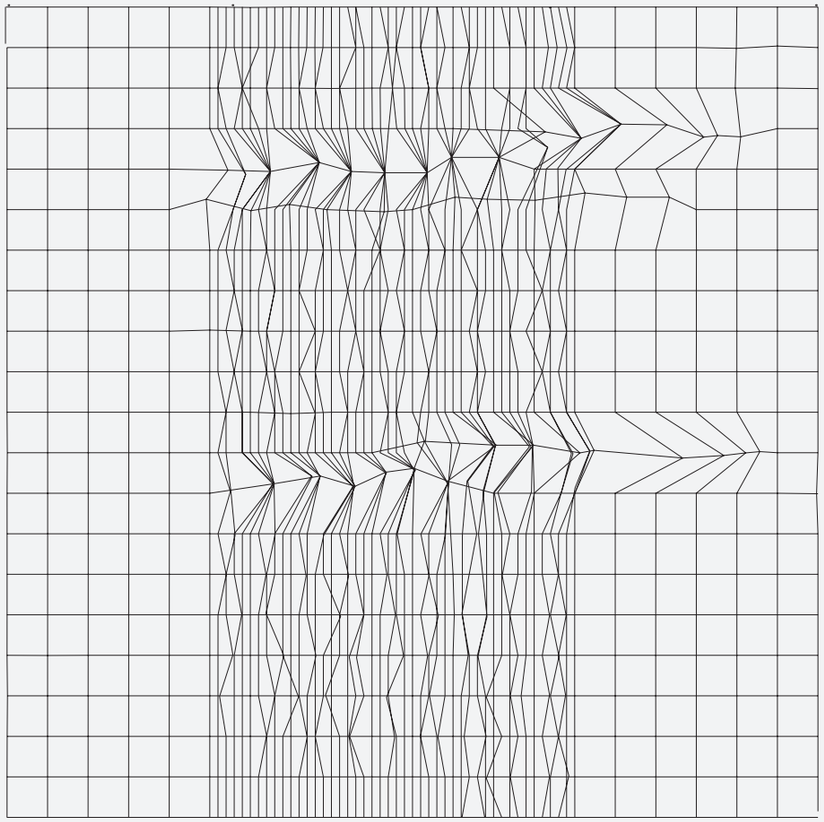


Figure 113. Niddrie Quarry - Surface and drainage. Keane, B. 2007.

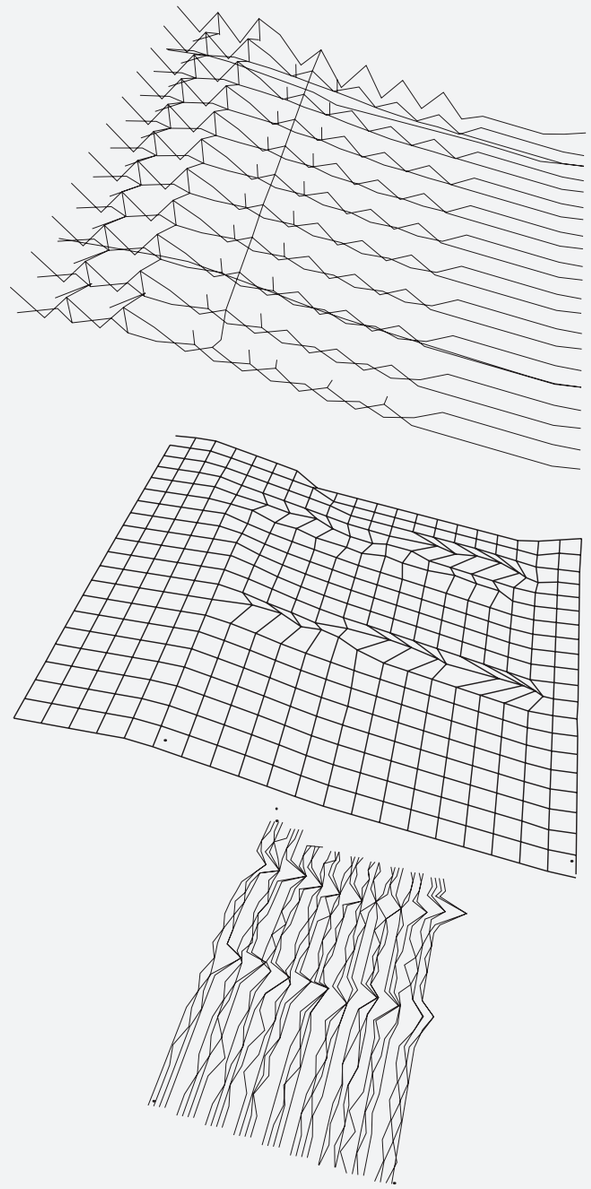


Figure 114. Niddrie Quarry - Surface and drainage layers. Keane, B. 2007.

Accumulation
Tension between the apparent finitude of a photographic image and the seemingly infinite possibilities of geometry was exposed and used to develop a ‘sensitive’ measure of the landscape, forming a set of drawings and images of the freeway landscape in Western USA. As a starting point, we used Étienne Jules Marey’s photographic studies of movement, specifically those in which he combined time-lapse photographs and overlaid drawings, tracing movement as a series of connected lines. We also used two types of imaging – the photograph and the diagram – as measures that could begin to map the physical structure (anatomy) and the internal workings (physiology) of the landscape.

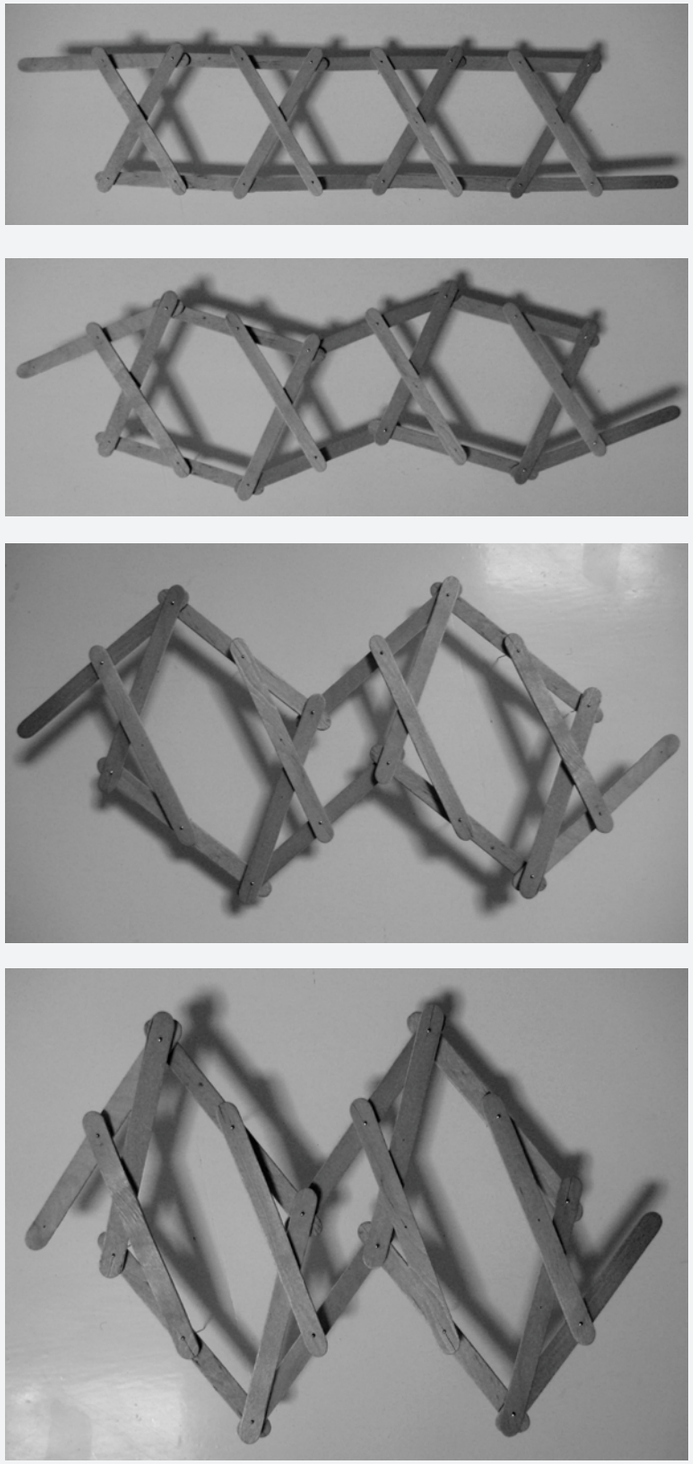
The need to possess space through the photograph, to fix it in time, is to secure a particular set of relationships, to make legible a single moment amidst the instability of numerous possible connections in space and time. Considering the diagram as something ‘unfixed’ between the photograph and form allows temporal and material information to inform the proposition. Here, ‘proposition’ becomes a potential or possible organisation with an embedded instability rather than a fixed outcome – though these possibilities do take material form. What the diagrams offer is the means to open points of intervention that offer new constructions of space/time that engage with both the structure and behaviour of various layers of the landscape.

Figure 115-117. Roadside Landscapes. Lucas, C. & Keane, B. 2007.

Process:
Abstraction
The structure (geology) and surface (topography) was researched through collecting images, text and drawings.

Paddle pop sticks were used to explore a specific geology, Creating point/line connections to understand the formation and structure. The repetition of the sticks allows the creation of an active geometry. The geology is seen as a live condition, forming (slowly) through pressure and forces that create transitions of matter. The sticks respond to pressure, redistributing forces across the point/line structure.

The relationships in the model were transitioned through modelling the point and line relationships digitally in three dimensions, modelling a responsive geometry that informs the form of the overlaid surface. The surface was modelled as an expression of the model in various states of formation.



Figures 118-121. Point and line models. Keane, B. 2015.

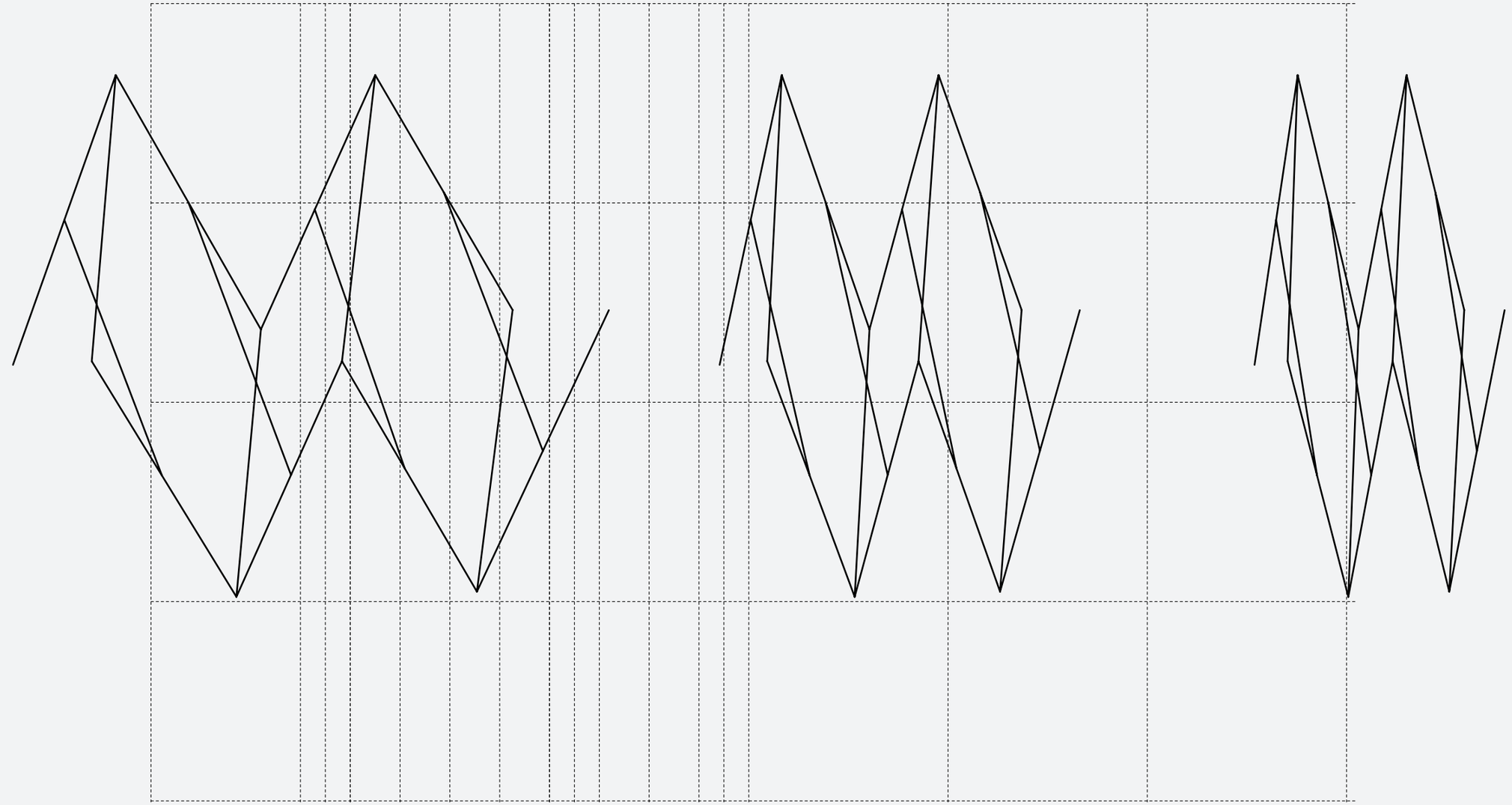
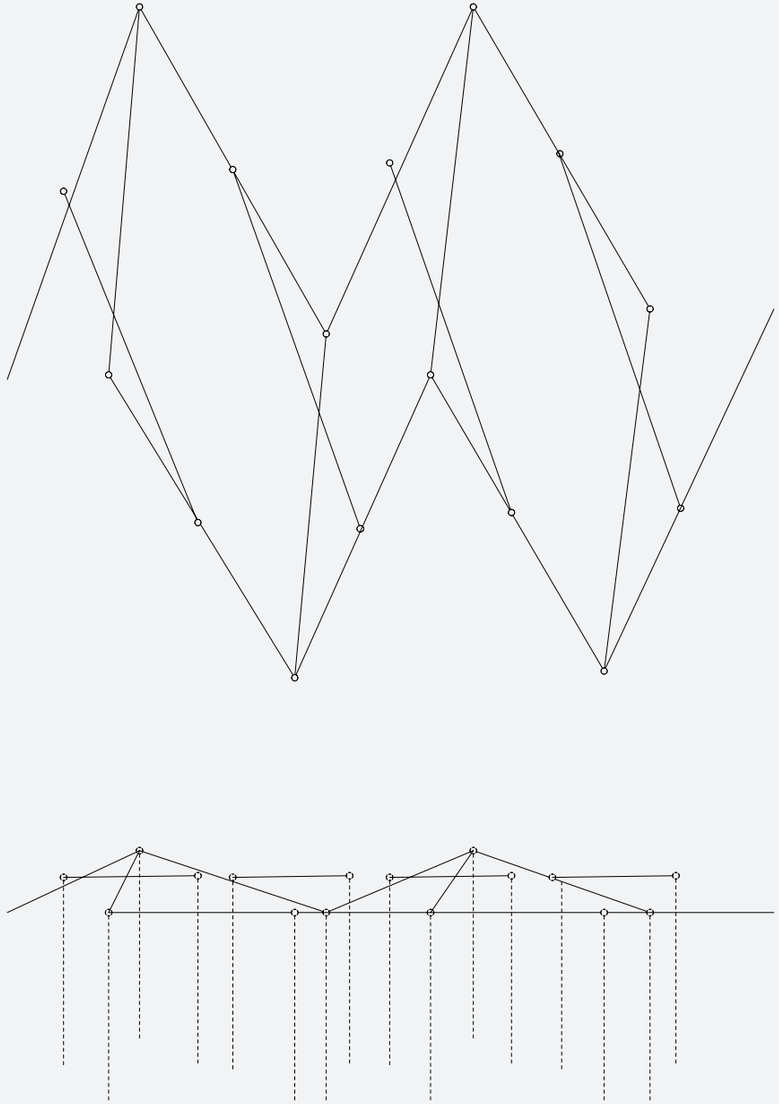
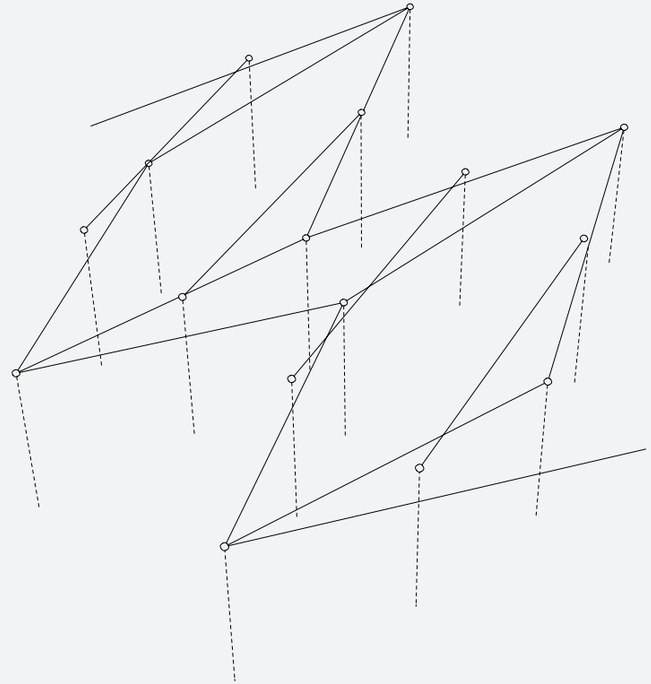
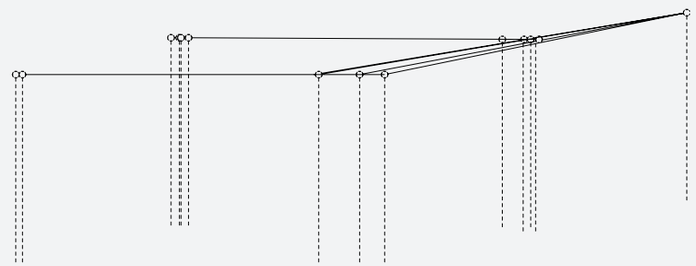


Figure 122. Point and line models - pressures. Keane, B. 2015.



Figures 123-124. Point and line. Plan and elevation. Keane, B. 2015.



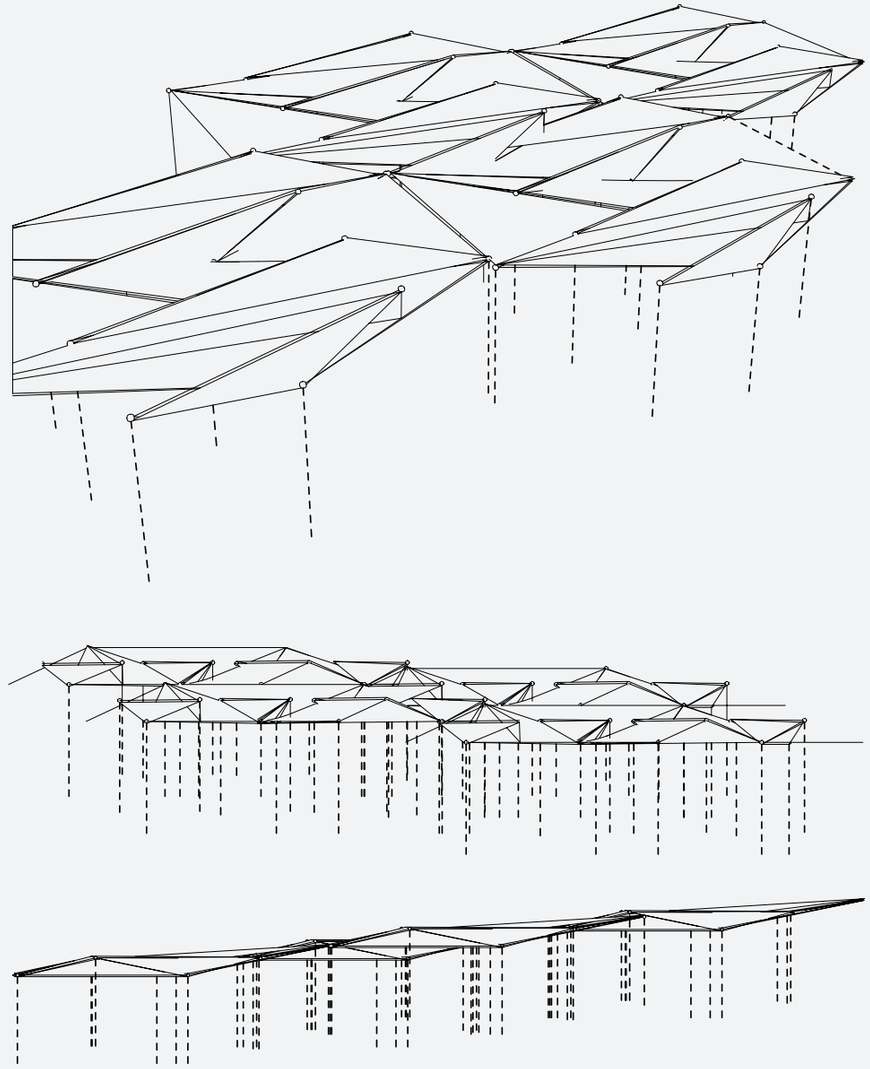


Figures 125-126. Point and line. Perspective and elevation. Keane, B. 2015.

Formalisation
Following on from modelling the relation between structure (point and line) and surface, the new sets of point/line and surface relations are amalgamated back into the site. The performative constraints of the site begin to influence the form, altering both the structure and the surface. Contour drawings, geological profile and water movement of the site are investigated as degrees of change that influence the formation of a new ground.

A structural merging of information of performance and the new information is developed.

Results/outcomes:
The amalgamation of drawing, analysis, and material performances occurs as an inextricable set of forces on the surface, creating a relationship between the intensive and extensive properties of site.



Figures 127-129. Surface. Perspective and side and front elevation. Keane, B. 2015.

6.3 Discussion

Introduction

The destabilisation of traditional notions of site in landscape architecture has resulted in an emphasis on techniques of conceptualisation and representation over overtly spatial or material practices, such that landscape has been considered more as a model of thinking rather than necessarily as a set of material conditions. There is a need for an understanding that goes beyond modelling (of the conditions of the landscape) as imitation, analogy or simulation. This would allow for a real consideration of material systems, as well as the apparatus through which they are constructed – a process of recoding the landscape. The material and phenomena (climate, performance) of landscape resists singular figuration. It evades definite, borders, edges and logics.

This Laboratory explores the idea of how the landscape is measured and drawn, and how these drawings relate to and produce material performances. The Laboratory proceeded through both practices of teaching and making projects that reconsider the act of contouring through the device of the grid.

Concerned with aspects of measure and matter, the projects question the relationship between the contour and the ground. The opposition between the two generates a dialogue. As a result, in the project the contour (line) takes on multiple types of measure through the grid – both quantitative and performative. Matter is transformed into the notion of ground – a

consideration of surface structure (topography) and underlying forces and processes (geology). This retooling of the measuring device (contour) to include performative and material characteristics introduces instability into the relationships between the contour, the structure and the surface, resulting in multiple material expressions.

The group of interactions has emerged from a longstanding obsession with the contour, its role and ubiquity in landscape architectural drawing, and the manner in which it is incorporated into design. The use of the grid as a device offers ways of reconsidering measure.

6.3.1 Topography & Geology

Topography sees the surface as a static entity. It is a means to describe the surface of the earth, where the surface of the earth (topo-) is understood in three dimensions through the notational device of the contour (-graphy). The contour allows only a reading of the surface, giving no indication of what formed it. A measure that assumes formation of the ground is complete and unmoving. On the other hand, geological maps register only performance not form, notations of movement, or types of interfaces (active) and actions. So how can the various distinctions of ground be understood? What divides the surface from its foundation, from the atmosphere?

Geology is 'intensive'; its formation is related to heat, pressure, movement and time. As a result geologists have had to develop forms of analysis and interpretation that allow for a notation of these forces. Compared with biological conventions of representation, geological drawings are less concerned with a pictorial representation of form or figure, but in the development of a series of codes that designate the effects of phenomena on material. It is a figuration of phenomena.

While some projects focus on a formal understanding of the surface characteristics of specific rocks, others relate to ground on a larger monumental scale. A key influence is useful to examine as a starting point – *Denia Mountain* by Guallart Architects. It is useful in terms of expanding an understanding of geological structuring and its possibilities in design.

In the *Denia Mountain* project a formal, geometrical analysis of a rockface gives rise to a system of faceting. The facets are scalable in that they can be sized up or down proportionally and still fit in with the overall surface, producing a variable surface that can accommodate level changes and different edge conditions. Guallart drew on the studies of Mont Blanc by Eugene Viollet-le-duc, who attempted to understand the underlying geological principles at work by producing maps using geometrical projections. However, the application indicates that projection is seen as a device to reduce the mountain to a series of geometrical figures that can then be replicated in any material. As Guallart states, 'measuring a rock turns it into an architectural

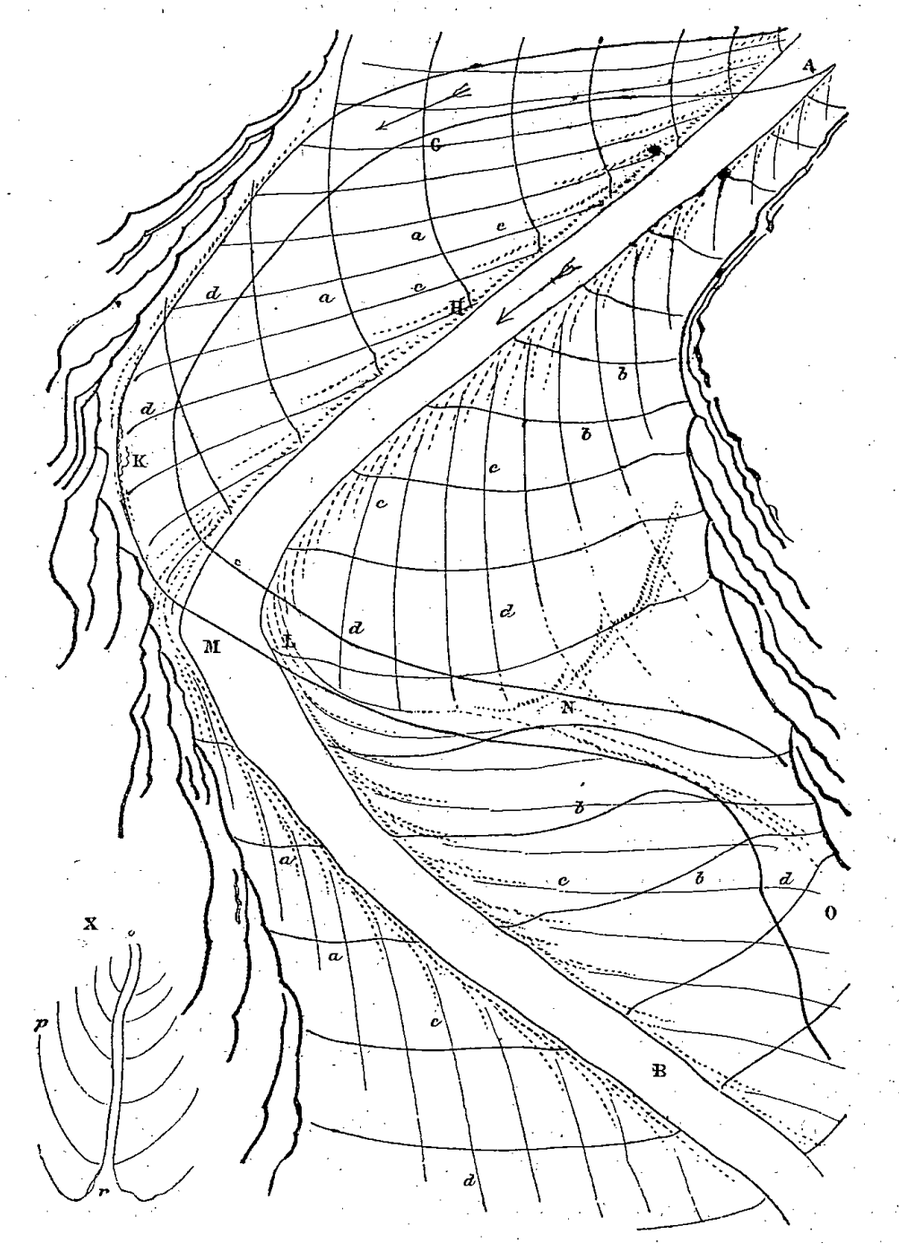


Figure 130. Mont Blanc. Viollet le Duc. 1877.

element' (Guallart, 2008). Geology is reduced to a series of proportions and angles. To a degree this denies the specificity of the drawings and, by extension, the nature of the ground. Focusing on a single moment in time means a focus on the static figure. However, by cultivating a broader understanding, the material transformations could allow for a dynamic ground.

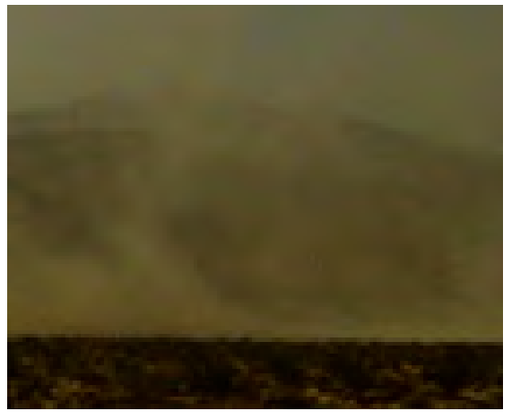
This possibility is a point of departure for a series of enquiries in which an alternative reading is of the geological is possible. That reading entails a realignment of perspective in which the geometry is not cast over the mountain. Rather it is derived from it, utilising geological principles of formation where the site/rock can be examined as a series of clues that tell of its origin, formation, pressure, erosion, time and movement. The drawings of Viollet-le-duc can then be seen as offering a system for determining the structure of certain geological forms (glaciers and rock types), their relation to one another and processes of change over time The line is encoded with performative information representing the ground itself as a productive and temporal entity.

6.3.2 Ground

A dust storm in Arizona. The dust swirls across the desert, choreographed by the wind. The layer of dust is a thickness sensible through density and patterns of movement, making it difficult to determine the edges and to discern where the ground begins and ends. This image begins to question the seemingly solid and static nature of ground. Is the ground a more solidified dust? Is the sky an aerated ground? By what means are these inextricably linked plays of form and performance to be discerned? What is the correct measure for this? The third in the series of laboratories seeks to address these questions.

Landscape is dynamic. It is a set of interacting conditions that alter structurally and materially at varying rates over time. To engage and work with this complexity requires adaptive modes of study of the landscape and, furthermore, dynamic modes of production. Through this laboratory, the act of representation is posited as responsive rather than static, an open dialectic between site, material and 'abstraction' – drawing/model – where making in itself is a process of both inert translation and active transformation. This approach is of particular interest in landscape architecture where the conditions of site and modes of design are often closely related.

> *Mr Palomar sees a wave rise in the distance, grow, approach, change form and color, fold over itself, break, vanish, and flow again. At this point he could convince himself that he has concluded the operation he set out to achieve, and he could go away. But it is very difficult to isolate one wave, separating it from the wave immediately following it, which seems to push it and at times overtakes it and sweeps it away; just as it is difficult*



Figures 131-133. Dust Storm, Arizona. Keane B. 2007.

to separate that one wave from the wave that precedes it and seems to drag it towards the shore, unless it turns against its follower as if to arrest it. Then if you consider the breadth of the wave, parallel to the shore, it is hard to decide where the advancing front extends regularly and where it is separated and segmented into independent waves, distinguished by their speed, shape, force, direction.
Mr Palomar, Italo Calvino, 1985 p3.

When regarding the landscape like Mr Palomar, like the dust storm, the task is endless. Waves rise and recede, sand shifts. The way of perceiving the landscape is as fluid as the water itself. It is evidence of the extensive nature of the landscape. It also begins to indicate the desire for, and use of, the survey as a way of controlling the frame for viewing and understanding the landscape. It is similar to the botanists square within species are counted and communities are extrapolated. The survey invents known points. Zero is placed and creates the beginning of a reference system – the grid.

In this way 'site' does denotes a geographical location or place, and is itself a construction. Too slippery for perception or observation alone, the landscape is created through the production of the means of surveying it, engendered by an active engagement with the phenomena of the environment. The mode has a logic that informs what is revealed. For example, topography is a fundamental frame of reference in landscape architecture as it articulates the ground upon which design acts are situated or embodied. However, it is generally seen as a static and unchanging entity that exists separate to other systems. Geology on the other hand is a way of conceptualising deep structure and long-term change (for example, mountain ranges, glaciers). An integration of these two scales of action is attempted via a process of abstraction.

Abstraction is seen as a way of bringing the landscape into the drawn or made. Any type of abstraction necessarily results in a loss or translation of information. What is of interest is the nature of the abstraction. Underlying this is an understanding that Euclidean order is not inherent to the landscape. Solid geometries are not something pre-existing, waiting to revealed through the labours of humanity. Rather, the material environment expresses itself in various ways that can be generalised – for example, the ways in which certain formations of bluestone

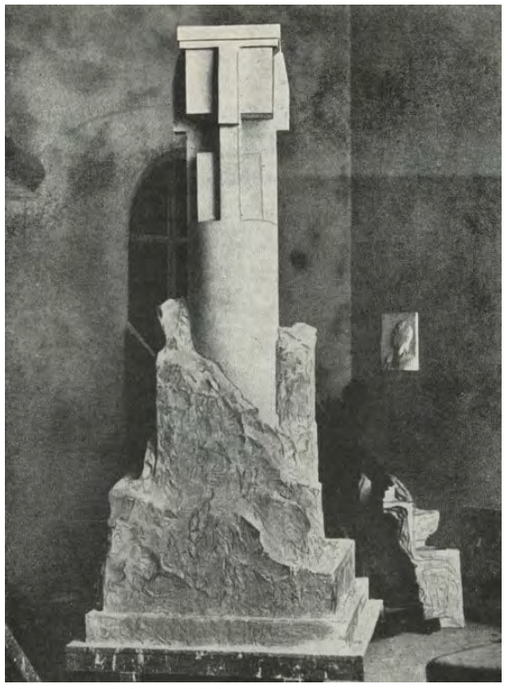


Figure 134. Column. Obrist, H. 1898.

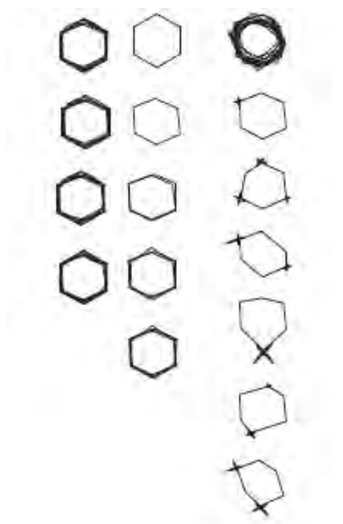


Figure. 135. Bluestone column formation. Keane, B. 2008.

emerge in almost, but never quite perfect, hexagonal forms. They are not striving for the hexagonal; rather the hexagon is the means to abstracting the form.

6.3.3 Measure

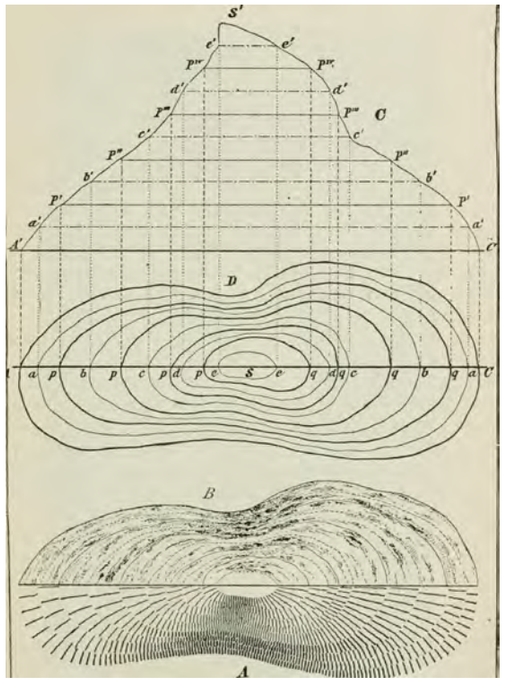
Conventional forms of measure in landscape architecture are the picture, the plan and the section. Yet, somehow, the landscape evades these techniques of framing. The 'frame' itself can be unfolded to consider the landscape in terms of "… how it works as a process, a continuing activity and set of relations that change over time." (Czerniak, 1998)It is where what is not normally seen or registered in the conventional means of imaging the landscape – things that are small, fast, slow or not easily registered – fall through the cracks or become smoothed over. Topography, water, vegetation, geology and so on are all defined by the specific limitations of the drawing types used to represent them, rather than how they behave. Nevertheless, all forms of imaging have particular limitations, but through becoming *conventional* we forget these limitations, or rather neglect to exploit them.

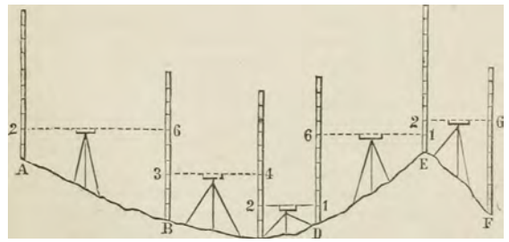
The processes of this laboratory propose a form of surveying where measure is an act of framing that can be calibrated to both the intensive and extensive; it is simultaneously analytical, transformative and projective. It is explored through a number of interconnected projects: Accumulation – a discussion of the moving landscape; Structure & Surface a series of investigations exploring alternatives to the contour; and a series of models investigating material expressions.

6.3.4 Contour

Of the many conventions in landscape architectural representation, this work is most interested in articulating the surface of the landscape through the contour line. Sitting at the nexus between geology and topography, line and matter, structure and surface, the contour is a fascinating place for enquiry.

If 'geometry is the action of projecting a figure' then the contour is a projection that exists as a background to every Landscape Architectural project. The contour line does not exist in the environment. Yet it is sometimes used in a very direct way to carve or configure the ground (at times being used directly in a design). This laboratory is formed around questioning possibilities for reconsidering this





Figures 136-137. Examples of contour formation. Wilson, H. 1902.

fundamental mode of representation, to take on more than numerical information about site. By beginning to incorporate performative aspects of the environment such that material and changes to the surface may form part of the representational, could the contour be reinterpreted to be a dynamic projection onto dynamic material?

The contour line and its effect are compared to the horizontal extension and expansiveness of surface. Structure is distinguished from the matter it orders. Geology is grasped as a deep understanding of ground and topography, as a rendering of the expression on the surface. Each, as we have seen in the previous sections, are intricately tied back into the other. The geology forms and influences the expression of topography on the surface of the ground.s

Contour lines are a means to convey the grade and transformations across areas of landscape. Each curved line is an expression of the relation between spot levels. Showing the undulations of the landscape though the contour is the standard method found in Landscape Architectural practice. Other cultures have developed devices that translate the environment, such as Polynesian Sea Charts (see image). Though they are not drawings, and so, not limited to the two-dimensional plane, the charts allow a reading of the sea through the phenomena that transform it – the currents, wind directions and adjacent land edges.

In this way we can shift from a rendering of the figure as a fixed entity to that which is part of – a series of relationships in transition. We can consider the figure in transition through the production of alternate measures. For example, the Polynesian sea charts describe a condition of performance – currents, winds and islands are represented in a dynamic modelling between the physical and the phenomena that informs the trajectory of the boat. Matter is posited as this intermediate condition, both physical form and the forces that bring it into being.

6.3.5 Matter

Matter refers to the inescapable materiality of the environment. Sets of behaviours emerge between materials and environment. It is their interaction with phenomena that produce their expression: a conflation of climatic conditions, limitations of formation and types of orders found in the world.

Matter is an unstable mediator. It cannot be wholly figured through the line. Yet the line is what reforms matter through design. For example, Vogt Landscape Architects engage with a sense of 'pure matter' of particular interest in the Novartis Campus Park. By slicing through the topographical surface to reveal, exhume and uplift a version of the geological, the project introduces an element of difference into the smoothness of the campus. This is designing through material strategies of layering references to geological strata.

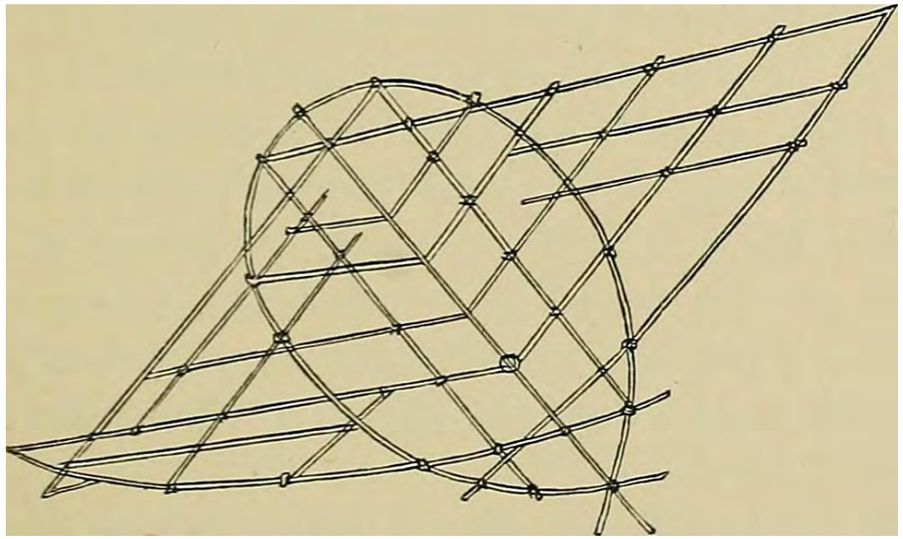


Figure 138. Polynesian Sea Chart. Ratzel, F & Butler, A. 1896.

Figure 139. Novartis Campus layering. Vogt. 2009.

6.4.6 Amalgamating

To consider the materiality and spatiality of the physical landscape through an interrogation of geology and topography. The lenses of 'structure' and 'surface' are used as as exploratory starting points to derive formal, material strategies for design, where structure is the information set of phenomena that informs the formation of the surface. This alignment relates to the concept of the epigenetic surface where 'forms represent nothing absolute, but rather structurally stable moments within a system's evolution' (Kwinter, 1992). In this case, the underlying structure or information set is seen to be a fluctuating entity that informs the physical manifestation of the 'top' surface.

The object of enquiry in the first instance is the geological formation. Principles are extracted from a number of geological phenomena by modelling the actions of that formation over time. These models were very simple – using paddle pop sticks and pins – and created a series of point line relationships that attempted to reduce the geology to pure performance (the logics that arise from the movement). In this way matter is embedded in the behaviour as the same force on different material is expressed differently. But each force has its own limiting character that then influences and become inextricably linked to the structure that is being 'observed'. The intent is to dissolve the boundaries between the landscape, drawing and form, and to reconfigure them as a continuous movement by working between the digital and analogue. Grids may emerge, but they are subsequent to the point line formations – not prior to them. The two are not considered as distinct. Rather they are different limitations that produce different images of the subject through the action of projection.

The final stage is a compositing of these multiple interpretations of topography and geology. The original subject (geological formation) is used to form a mode of interpreting structure on site which then produces a third inflected condition. This is a moment of design where the performances are redirected. The line is adjusted, its effects considered and then fabricated. Mediation through the geometry produces what Sanford Kwinter describes as a manipulation of 'the focus, viscosity, direction and fibrosity of these material flows' producing 'new shapes of order.' (Kwinter, S. & Boccioni , 1992)

Each alteration leaves its mark on the new topography. The qualitative and quantitative are merged and redistributed. It is a dynamic projection onto dynamic material. So at each stage the constraints of the grid inform the possible variations.

To move beyond a formal use opens the possibility of considering modulations that would give 'rise' to alternative formations that would have to become compatible with the surrounding surface. Thus process amalgamates that which emerges from the conditions and allows for multiple inputs to generate transformations in the surface.

In this laboratory, the projects enabled movement from measure to structure to amalgamating. Questions of how to measure the dynamic of the landscape identified the survey as a crucial device to enable interaction with the boundless qualities of the landscape. Investigations into alternative means to represent and transform the ground in major project work initiated further projects that developed techniques which are simultaneously reflective and projective.

The shifting of the surveying of the contour to the grid allows a move to consider structure and surface as interacting entities introduces phenomena as a key influence on matter. Creating formation. The projects propose types of intervention that exist at the nexus of the surface (formal expression) and the structure (performative and transformative information), speculating on new modes of generating form.

Figure VII. Granite - Cradle Mountain, Tasmania. Keane B. 2010.

7.0 Conclusions

7.1 Conclusions:

This research began by questioning how to creatively reclaim commonly used devices for looking at landscape found in the discipline of landscape architecture. Reorienting these devices as the primary act of formation in the design process. The line of enquiry soon revealed that landscape was not a singular condition in any sense. Various origins and lineages within the discipline of landscape architecture were exposed. There were manifold devices and instruments used to perceive it borrowed from these lineages. Further, variations appeared through the many forms of expression as a result of the modification of these devices.

As the research progressed, it became clear that the 'multiplicity of landscape' was as much an existing condition found in the world as an inherent part of a design research practice. Multiplicity is articulated through a practice with several trajectories of exploration. Demonstrated most plainly through the three laboratories with their specific agendas and devices. Multiple themes emerge from the laboratories. And though the laboratories are distinct lines of enquiry, the devices, techniques and thematics inform one another.

This distinction between these lines of enquiry provides enough constraint to make each laboratory productive and self-sustaining as a component of the practice. It also serves to coalesce smaller 'local' communities of practice. They speak towards a practice of defining and containing then exploring and expanding which occur as parallel activities across multiple lines of enquiry.

Figure 140-141. Landscape as picture. Keane, B. 2001.

Within these explorations the device emerged as a way of working in the tricky space between looking and making. It also became clear that although these devices are widespread in landscape architectural practice, until now there has been little focus on them as design devices. To address this notion of the device in Landscape Architectural practice a re-reading of two key landscape architects – Halprin and Corner – provided examples of practices that utilise various forms of devices to produce landscape. Through an analysis of their works via the device, a set of ideas unfolded about constraint and variation. Where the device sets the parameters for looking and acting producing variations in form. This is best exemplified in the continuous formations in the Lovejoy Fountain (Halprin) and the multiple scenarios for Fresh Kills (Corner). The device as a form of productive constraint was then investigated.

The targeting of specific devices incorporated the viewing of landscape from three perspectives each with their own tendencies and possibilities. The selection of devices is by no means exhaustive. Rather, it is demonstrative of the practice where of a series of techniques and understanding of the device that unfolds from each project.

The discoveries and contribution of this work are discussed through the following subsections:

- Establishing narrative structures to develop multiple lenses that link larger thematics to design projects and actions.
- The identification of three devices for landscape architecture allowed different forms of site and subsequent actions to emerge.
- Reframing of the foundation of the devices unpacked the underpinnings of the lineage of the device.
- Modification of the devices produced new techniques for the formation of landscape.
- Instability emerged as a key to understanding the mediation of landscape through the devices.

7.2 Establishing narrative structures to develop multiple lenses that link larger thematics to design projects and actions.

At the scale of the research a narrative structure was formed through the laboratories. Myth making was a key mode of action. The adaptation of the scientific form of the laboratory allowed for a creative reinterpretation of the overall form of the research and an explanation of the deployment of the devices. In this case, the laboratory itself is seen as a device. One that is modified for the purposes of discussion the inherent methods of design projects and their larger meaning and context.

The myth making of the laboratory allowed for a discussion of the projects in keeping with the ideas of the research and creating a productive tension between the laboratories and the design projects. The reinterpretation of these common forms has allowed the research to talk at both the scale of the curator and the scale of the maker. The multiple lenses allowed for the many variations of the research and the projects that emerged.

7.3 Devices

A significant contribution of the research is the notion of the device. Though many instruments, conventions and processes have been imported into the discipline of landscape architecture, their use and agency has remained largely unexamined. As a way to focus on the specific ways in which the landscape is mediated and subsequently designed, the device as a central idea opened up the multiple lineage of landscape to reinterpretation. Making the possibility for an extended reconsideration of the multiple lineages and their instruments.

The research not only discusses the idea of the device, but also extends this understanding by actively reinterpreting it through a series of projects.

The identification of three devices for landscape architecture allowed different forms of site and subsequent actions to emerge.

The identification of the three devices used in the research emerged from the design projects. The microscope, the petri dish and the grid were generated from the projects and then expanded and connected. Covering three perspectives on landscape, from above, from inside and across. As the history of landscape architecture has multiple lineages. Drawing from many different fields. The three devices are key points along a line that transects landscape architectural discourse.

Along this transect the devices cross three key themes of importance to landscape architecture. Each begins to unfold a perspective on how we look at the landscape, the position of the designer in relation to it and the larger themes that emerge. The investigation of the theme of projection questions the relation of the landscape to representations that attempt to contain it. The notion of environment, the organisms that inhabit and the role of the designer within a system are explored by the petri dish. Finally the twin traditions of topography and geology are used as examples of how to develop means to integrating various sets of information – qualitative and quantitative.

7.4 Reframing of the foundation of the devices unpacked the underpinnings of the lineage of the device.

By considering the agency of the device, its characteristics and limitations, a holistic reconsideration of the device was enabled. The device is seen not just as a style or form of representation, but as a way of seeing that transforms the object under examination. The alteration of the microscope allows for an active consideration of the agency of the lens. The development of species in the petri dish questions the distinction between

organism and environment. The modification of the contour through the grid is not just representational, but begins to question the ideas of measure and material expression. Thus the device was not simply appropriated from its origins but was explored through the *baggage* that came along with it from is home discipline.. The assumptions, norms and principles that exist in the original use are reconfigured and reconsider through a landscape architectural lens.

7.5 Modification of the devices produced new techniques for the formation of landscape as multiple.

As each device was modified and adjusted, a range of techniques was generated.

7.5.1 Thematic - Projection:
Creating relationships between geometry and the matter of site through projection.

The Canberra University project – Generating Faculties incorporates the institution into the environment and the environment into the institution through the microscopic lens. As a result of examining the microscopic lens, site emerges as a manifold construction between multi-scalar processes and phenomena of the environment. The moving in and out of the lens facilitates connections between operations of the landscape at various scales. The shifting lens integrates larger geometries and processes in various combinations. Designing an institution that is continuously sprouting new spatial relationships.

7.5.2 Thematic: Growth
Alternate means of formation:
Creating formal expressions within larger systems
Within the Plastic Soup project there are multiple trajectories and offshoots as a result of generating both a set of large-scale relationships and small-scale formal operations. The petri dish

becomes the mechanism for the production of form. Form was developed through a separation of inputs and outputs and the attribution of a specific set of behaviours. The petri dish then expands to inform the connections across the entire system of the Pacific Ocean. As a series of techniques for growth – one occurs at the scale of the organism, behaviours and inputs determining form. The other, at the scale of the system, growth occurs through an accumulation of resources and exchanges between orders of the system.

7.5.3 Thematic: Amalgamation
Engage directly with material behaviours through modelling and drawing:

A replacement of the contour with the device of the grid questions the singular notion of measure. And allows for multiple forms of measure that incorporate quantitative and performative aspects. Giving rise to alternate techniques of forming. Revealing that the two ways of looking at ground – topography and geology could be integrated through a consideration of the surface (expression) and structure (formative pressures). The modification of the grid generates an amalgamated surface condition. This condition is then informed by material transformations.

7.6 Instability emerged as a key to understanding the mediation of landscape through the devices.

The focus on the device and its limitations through a series of projects led to the development of concepts of instability. As a key concept that emerged from the research, instability was a means to understand the creative possibilities of the device. It formed a key moment in reconsidering the agency of the device and a means to evaluate successful modification. The operations of the devices indicate that it is the inherent constraints of the device that generate and allow movement and expression.

Figure 142. Walter de Maria, Lightning Field. Keane, B. 2007.

The three emergent themes outlined above – projection, growth and amalgamation each indicate a different form or scale of instability. With projection, instability occurs between the projected figure and the performance of the landscape. Through growth, instability is considered as the dynamic shifts between inputs and outputs of the system and their manifestation through the behavioural and formal limits of the species. Amalgamation proposes a type of instability that exists between geometry and material expressions.

In the land art project *The Lightning Field*, Walter de Maria installed a series of poles in a grid formation over the landscape in Arizona. At first seeming to fit into a Cartesian style of overarching control, the project has the opposite effect when experienced. The poles do not control the view but rather oppose habits of pictorializing the landscape into its elements. Instead what are revealed are variations in the surroundings, the colours, textures and ephemeral changes. Dissolving the elements (the mountain range, the ground, the sky) into performance.

In this way, modes of looking through the landscape facilitate the production of variation. If we consider that movement from one thing to another is often generated by differences - in level (water), temperature, gradient (osmosis), currency (flow of capital) then instability is the ideal condition for the production of the multiple. It is differences that allow movement between the device and matter. At each scale and state of transformation allowing for the possibility of the multiple to be produced. Between landscape and device. Narrative and action. Instability is the condition that became apparent through the trajectory of the research, opening up the possibility for future investigations through further exploration of these devices, and others.

Figure VIII. Image overlays. Keane, B. 2015.

8.0 Bibliography & Image Credits

Bibliography

A

Allen, S. (2011). *Landform building: Architecture's new terrain*. Baden, Switzerland: Lars Müller.

B

Barthes, R., & Lavers, A. (1972). *Mythologies*. New York: Hill and Wang.

Barthes, R., & Heath, S. (1977). *Image, music, text*. New York: Hill and Wang.

Bateson, G. (1979). *Mind and Nature*. London, Wildwood House Limited.

Bergson, H., & Paul, N. (1912). *Matter and memory*. London: G. Allen & Co.

Bohm, D. (1981). *Wholeness and the implicate order*. London: Routledge & Kegan Paul.

Briggs, D., & Smithson, P. (1985). *Fundamentals of physical geography*. London: Hutchinson.

Byrne, D. (2012). *How music works*. San Francisco: McSweeney's.

C

Cache, B., & Speaks, M. (1995). *Earth moves: The furnishing of territories*. Cambridge, Mass: MIT Press.

Calvino, I. (1985). *Mr. Palomar*. San Diego: Harcourt Brace Jovanovich.

Considine, G. D., & Kulik, P. H. (2002). *Van Nostrand's scientific encyclopedia*. New York, NY: Wiley-Interscience.

Corner, J., & MacLean, A. (1996). *Taking measures across the American landscape*. New Haven: Yale University Press.

Corner, J. (1997). *Ecology and Landscape as Agents of Creativity*. In G. Thompson (Ed.), Ecological design and planning. New York: John Wiley.

Corner, J. (1999). *Recovering landscape: Essays in contemporary landscape architecture*. New York: Princeton Architectural Press.

Crary, J. (1990). *Techniques of the observer: On vision and modernity in the nineteenth century*. Cambridge, MA: MIT Press.

Czerniak, J. (1998). *Challenging the pictorial:* Recent landscape practice. Assemblage, 34.

D
Dagognet, F. (1992). *Etienne-Jules Marey: A passion for the trace*. New York: Zone Books.

Darwin, Charles. *On the Origin of Species by Means of Natural Selection, or the Preservation of Favored Races in the Struggle for Life*. Champaign, Ill: Project Gutenberg, 199.

Duc, E., & Duc, E. (1877). *Mont Blanc: A treatise on its geodesical and geological consitution; its transformations; and the ancient and recent state of its glaciers*. London: Sampson Low.

E
Eugenides, J. (2002). *Middlesex*. New York: Farrar, Straus, Giroux.

F
Feyerabend, P. (1975). *Against method: Outline of an anarchistic theory of knowledge*. London: NLB.

Funder, A. (2003). *Stasiland*. London: Granta Books..

G
Grosz, E. (1999). *Becomings: Explorations in time, memory, and futures*. Ithaca: Cornell University Press.

Guallart, V. (2008). *GeoLogics: Geography, information, architecture*. Barcelona: Actar.

H
Halprin, L. (1972). *Lawrence Halprin notebooks, 1959-1971*. Cambridge, Mass: M.I.T. Press.

Halprin, L., & Chang, C. (1978). *Lawrence Halprin*. Tokyo: Process Architecture Publishing.

Halprin, L. (1981). *Sketchbooks of Lawrence Halprin*. Tokyo, Japan: Process Architecture.

Hara, K. (2010). *White*. Baden, Switzerland: Lars Müller.

Haeckel, Ernst, and E. Ray Lankester. (1876) *The History of Creation, Or, The Development of the Earth and Its Inhabitants by the Action of Natural Causes: A Popular Expositon of the Doctrine of Evolution in General, and of That of Darwin, Goethe, and Lamarck in Particular*. 6th ed. New York: D. Appleton and Co.

Herzog, W. *Cave of forgotten dreams* [Motion picture]. (2011). Creative Differences Productions, Inc.

Hustvedt, S. (2003). *What I loved: A novel*. New York: Henry Holt.

K
Kundera, M. (1991). *Immortality*. New York: Grove Weidenfeld.

Kwinter, S. & Boccioni U. *Landscapes of Change: Boccioni's "Stati d'animo" as a General Theory of Models*. Assemblage, No. 19, (Dec., 1992), pp. 50-65.

L
Landa, M. (1997). *A thousand years of nonlinear history*. New York: Zone Books.

Lepucki, E. (2014). *California: A novel*. Little, Brown.

Lim, C. J. (2006). *Devices: A manual of architectural spatial machines*. Oxford: Architectural Press.

M
Malraux, Andre. (1967). *Museum without Walls*. Garden City, N.Y.: Doubleday.

Manaugh, G. (Ed.) (2013). *Landscape futures: Instruments, devices and architectural inventions*. Barcelona: Actar.

McHarg, I. (1969). *Design with nature*. Garden City, N.Y.: Published for the American Museum of Natural History [by] the Natural History Press.

McQueen, S. (1996) *'Bear'*. Film, 16 mm, shown as video, projection, black and white. Tate.

Meyer, E. (1997). *The Expanded Field of Landscape Architecture.* In G. Thompson (Ed.),Ecological design and planning. New York: John Wiley.

Michaud, P. (2004). *Aby Warburg and the image in motion*. New York: Zone Books.

Morris, P. J. T. (2015) *The Matter Factory: A History of the Chemistry Laboratory*. London: Reaktion Books.

Murakami, H., & Gabriel, P. (2014). *Colorless Tsukuru Tazaki and his years of pilgrimage*. Toronto: Bond Street Books.

O

O'Brien, F. (1999). *The third policeman: A novel.* Normal, IL: Dalkey Archive Press.

P

Payne, A. A. (2015). *Vision and its instruments: Art, science, and technology in early modern Europe.* University Park, PA: Pennsylvania State University Press.

Perec, G., & Sturrock, J. (1997). *Species of spaces and other pieces*. London, England: Penguin Books.

Perec, G. (2003). *Life, a user's manual.* Boston: Vintage.

Q

Queneau, R. (1981). *Exercises in style*. New York: New Directions.

R

Rajchman, J. (1998). *Constructions*. Cambridge, Mass.: MIT Press.

Reed, C., & Lister, N. (Eds.). (2014). *Projective ecologies*. New York: Actar.

Reiser, J., & Umemoto, N. (2006). *Atlas of novel tectonics*. New York: Princeton Architectural Press.

S

Smithson, R. (1973). *Frederick Law Olmstead and The Dialectical Landscape.* Artforum,February, 62-68.

Sontag, S. (1977). *On photography.* New York: Farrar, Straus and Giroux.

T

Trummer, P. (2008). *Architecture of the Many*. In M. Hensel (Ed.), Morpho-ecologies. London: Architectural Association.

W

Waldheim, C. (2006). *The landscape urbanism reader*. New York: Princeton Architectural Press.

White, D. (1998). *Postmodern ecology communication, evolution, and play*. Albany: State University of New York Press.

Z

Zellini, P. (2005). *A brief history of infinity.* London: Penguin.

Image Credits

Dividers:
I. Afflick, G, Douglas C, Keane B, Monacella R, Tan G. 2008. (Designers). Transformative surface. [Terrestrial Scan]

II. Keane, B. (Photographer). 2014. Euclidian Solids, teaching models. [Photograph].

III.Keane, B. 2012. (Photographer). Slag heaps - South Australia. [Photo].

IV. Keane, B. 2013. (Designer) New faculties - Canberra University. [Collage].

V. Keane, B & Lucas, C. (Designers). 2010. Driftus Currenti - Plastic Soup. [Drawing].

VI. Keane, B. (Designer). 2015. Multiple Grids - Simpson Desert. [Model].

VII. Keane, B. 2010. (Photographer) Granite - Cradle Mountain, Tasmania. [Photo].

VIII. Keane, B. (Photographer). 2015. Image overlays. [Photo].

Image Credits:
1. Darwin, C. (Artist). 1859. Tree of Life, Charles Darwin, *On the Origin of Species by Natural Selection.* [Digital Image]. *Retrieved July 30, 2014 from* https://commons.wikimedia.org/wiki/File:Darwins_tree_of_life_1859.png

2. Warburg, A. 1924-1929. Mnemosyne Atlas. Meanderings through Aby Warburg's Atlas. (203). [Digital Image]. Retrieved September 7, 2014, from http://warburg.library.cornell.edu/

3. Keane, B. (Designer). 2015. Exhibition Layout – Devices. [Drawing].

4. Unknown. 1775-1780. Claude Glass, [digital image.] © Victoria and Albert Museum, London. Retrieved August 2, 2015, from http://collections.vam.ac.uk/.

5. Rosetti. (Painter) 1874. Prosperine (persephone). [Digital image]. Photo: © Tate, London 2015. Retrieved August 2, 2015, from http://www.tate.org.uk/

6-15. Various aerial photographs. Canberra University. [Digital Image]. Map data ©2015 Google

16. Hitchcock, G. 1874. *The geology of New Hampshire. p699.* [Digital Image]. Retrieved September 16, 2014, from https://www.flickr.com/photos/internetarchivebookimages/

17. 1987. *Simpson Desert South*. Australia. Aerial Photography Flight Diagram. sheet SG53-8. Division of Natural Mapping, Canberra. [Digital image]. Retrieved September 16, 2014, from http://www.ga.gov.au/flight-diagrams/FlightDiagram.flightDiagrams?SG5308

18. Keane, B. (Designer). 2015. The survey. [Drawing].

19. Keane, B. 2007. (Photographer) Dust storm, Arizona. [Photo].

20-22. Keane, B & Lucas, C. (Photographers) 2004.Stake experiments, Pt Londsdale. [Photo].

23. Keane, B. (Photographer) 2014. Turbulence, Yarra River. [Film still].

24-25 Arnaud Frich. (Photographer) Alcove of the Lions. Centre National de Préhistoire. Ministère de la Culture et de la Communication. [Digital image]. Retrieved 9th August, 2015, from http://archeologie.culture.fr/chauvet/en/ - CC-BY-SA 3.0 EN

26. Halprin, L. (Designer). 1968. Fountain Choreography. [Diagram].

27. Corner, J et al. (Designer). 2001. [Phasing diagram]. Fresh Kills Park. [Diagram]. Retrieved from http://www.nyc.gov/html/dcp/html/fkl/fkl4.shtml

28-29. Halprin, L. (Designer). 1968. Formations, Lovejoy Plaza. [Photo.]

30-31. Corner, J et al. (Designer). 2001. Overlays, Fresh Kills Park. [Diagram]. Retrieved from http://www.nyc.gov/html/dcp/html/fkl/fkl4.shtml

32. Keane, B. (Designer). 2009. Layers, Ho Chi Minh City. [Photograph of model].

33. Keane, B. (Designer) 2009. Folding, HCMC. [Photograph of model].

34. Keane, B. (Designer). 2008. Revealing, Melbourne City. [Photograph of model].

35.Keane, B. (Designer). 2011. Density, Material + line Testing. [Photograph of model].

36.Keane, B. (Designer). 2011. Pouring, Material + line Testing. [Photograph of model].

37. Keane, B. (Designer). 2014. Canberra University campus plan. [Drawing].

38. Griffin, W. B. (Designer) Plan of Canberra. Courtesy National Archives of Australia. Digital Image.

39-42. Keane, B. (Designer). 2015. Modified from Plan of Canberra, Walter Burley Griffin. Axis and end points. [Digital Image].

33-46. Keane, B. (Designer). 2015. Modified from Plan of Canberra, Walter Burley Griffin. Armature around lake. [Digital Image].

47-50. Keane, B. (Designer). 2015. Modified from Plan of Canberra, Walter Burley Griffin. Infrastructural unfurling. [Digital Image]

51. Keane, B. (Designer). 2014. Griffin Axis – Extension. [Drawing].

52. Keane, B. (Designer). 2014. Armature - River & Lakes extents. [Drawing].

53-55. Maintenance forms, Canberra University. [Digital Image]. Map data ©2015 Google.

56-58. Drainage forms, Canberra University. [Digital Image]. Map data ©2015 Google.

59-61. Parking forms, Canberra University. [Digital Image]. Map data ©2015 Google.

62. Keane, B. (Designer). 2014. Multiple faculties. Canberra University. [Collage].

63. Keane, B. (Designer). 2014. Faculty Type 1. Canberra University. [Collage].

64. Keane, B. (Designer). 2014. Faculty Type 2. Canberra University. [Collage].

65. Keane, B. (Designer). 2014. Faculty Type 3. Canberra University. [Collage].

66. Keane, B. (Designer). 2014. Faculty Type 4. Canberra University. [Collage].

67. Keane, B. (Designer). 2014. Faculties in landscape. Canberra University. [Drawing].

68. Keane, B. (Designer). 2015. Faculties projected onto landscape. [Collage]

69. Keane, B. (Designer). 2015. Through the scope, vegetation. [Photograph of drawing].

70. Keane, B. (Designer). 2015. Projections onto, layering through scale. [Photograph of drawing].

71. Keane, B. (Designer). 2015. Realignments, projection through the scope. [Photograph of drawing].

72-73. Keane, B. (Designer). 2015. Variations of clusters. [Photograph of drawing].

74. Von Delagrife. (Artist). 1746. Plan of Versailles. [Drawing].

75. Von Delagrife. (Artist). 1746. Detail of Trianon - The Palace and grounds of Marie Antoinnette. [Drawing].

76. Cedric Price. (Architect). 1964. Master Diagram Potteries Thinkbelt. [Drawing]. Courtesy of the Canadian Centre for Architecture, Montreal. http://www.cca.qc.ca/en

77. Cedric Price. (Architect). 1964. Axonometric of the Madeley transfer area for the Potteries Thinkbelt. [Drawing]. Courtesy of the Canadian Centre for Architecture, Montreal. http://www.cca.qc.ca/en.

78. Keane, B. (Designer). 2015. Redrawing of Open planting scheme - OMA. Tree City. [Diagram].

79. Keane, B. (Designer). 2014. Canberra University, New Faculties overlay. [Collage].

80. Keane, B. (Photographer/Designer). 2008. Transformative Surface. [Photo].

81. Keane, B. (Photographer/Designer). 2008. Transformative Surface - Overlay of 10 film frames. [Film Stills].

82. Afflick, G, Douglas, C. Keane, B, Monacella, R & Tan, G. (Designers). 2008. Transformative Surface. [Terrestrial scan].

83. Keane, B. (Designer). 2009. Growths - Fabric forms. [Photograph of models].

84. Keane, B. (Designer). 2009. Growths - Plaster forms. [Photograph of models].

85. Keane, B. (Designer). 2009. Growths - In site. [Photograph of models].

86. Keane, B. (Designer). 2008. Site Plan - Pacific Ocean. [Drawing].

87. Keane, B. (Designer). 2008. Site Plan - Currents and Drifts. [Drawing].

88. Keane, B. (Designer). 2008. Site Plan - Gyres and garbage. [Drawing].

89. Keane, B. (Designer). 2014. Turbulence, Pacific Ocean. [Drawing].

90. Keane, B. (Photographer). 2014. Turbulence, Yarra River. [Photo].

91. Keane, B. (Designer). 2014. Eddies, Pacific Ocean. [Drawing].

92. Keane, B. (Photographer). 2014. Eddies, Yarra River. [Photo].

93. Keane B and Lucas C. (Designers). 2008. Terra Plasticus.sp. [Drawing].

94. Keane, B. (Designer). 2014. Terra Plasticus salt encrustation - providing rigidity. [Photograph of model].

95. Keane, B and Lucas C. (Designers). 2008. Terra Plasticus accumulation pattern. [Drawing].

96. Keane, B and Lucas, C. (Designers) 2008/ Minutis dispersus.sp. [Drawing].

97. Keane, B and Lucas, C. (Designers). 2008. Minutis dispersus and Terra Plasticus - mutual attachment. [Drawing].

98. Keane, B and Lucas, C. (Designers). 2008. Driftus currenti.sp. [Drawing].

99. Keane, B and Lucas, C. (Designers). 2008. Driftus currenti – expansion. [Drawing].

100. Keane, B and Lucas, C. (Designers). 2008. Interaction map. [Diagram].

101. Keane, B and Lucas, C. (Designers). 2008. Inhabitation. [Collage].

102. Keane, B and Lucas, C. (Designers). 2008. Distribution and Collection. [Collage].

103. Keane, B and Lucas, C. (Designers). 2008/ Species off coast of Hawaii. [Collage]

104. Keane, B. (Designer). 2014. Augmenting Darwin's tree of life. [Diagram].

105. Unknown. 1856. Wardian Case. The Gardeners' Chronicle and Agricultural Gazette. [Digital Image]. Retrieved September 16, 2014, from https://www.flickr.com/photos/internetarchivebookimages/

106. Haekel, E. (Artist). 1880. Plate xiv. Monophyletic pedigree. History of Creation. [Digital Image]. Retrieved August 13, 2015 from http://www.gutenberg.org/files/40473/40473-h/40473-h.htm#Page_112

107. Corner, J. Et al - Field Operations. (Designers). 2001. Fresh Kills phasing. [Digital image]. Retrieved from http://www.nyc.gov/html/dcp/html/fkl/fkl4.shtml

108. Crick & Watson. (Photographer unknown). 1953. Original DNA demonstration Model

109. Darwin, C. (Artist). 1859. Tree of life. On the Origins of Species by Natural Selection. [Diagram].

110. Keane, B. (Photographer). 2006. Niddre Quarry. [Photo].

111. Keane, B. (Designer). 2007. Alternative Contours. [Photograph of model].

112. Keane, B. (Designer). 2007. Grid as structure. [Photograph of model].

113. Keane, B. (Designer). 2007. Niddrie Quarry - Surface and drainage. [Drawing].

114. Keane, B. (Designer). 2007. Niddrie Quarry - Surface and drainage layers. [Drawing].

115-117. Keane, B and Lucas C. (Designers). 2007. Roadside Landscapes. [Collage].

118-121. Keane, B. (Designer). 2014. Point and line models. [Photograph of models].

122. Keane, B. (Designer). 2014. Point and line models – pressures. [Drawing].

123-124. Keane, B. (Designer) 2014. Point and line. Plan and elevation. [Drawings].

125-126. Keane, B. (Designer). 2014. Point and line. Perspective and elevation. [Drawings].

127-129. Keane, B. (Designer). 2014. Surface. Perspective and side and front elevation. [Digital Image].

130. Duc, E., & Duc, E. (Artists). 1877. Mont Blanc: A treatise on its geodesical and geological constitution; its transformations; and the ancient and recent state of its glaciers. London: Sampson Low. [Drawing].

131-133. Keane, B. (Photographer). 2007. Dust Storm, Arizona. [Photo].

134. Obrist, H. Column. (Artist). 1898. [Drawing].

135. Keane, B. (Designer). 2008. Bluestone, column formation. [Diagram].

136-137. Wilson, H. (Artist). 1902. A treatise on land-surveying; comprising the theory developed from five elementary principles; and the practice with the chain alone, the compass, the transit, the theodolite, the plane table, &c. Illustrated by four hundred engravings. Retrieved September 16, 2014, from https://www.flickr.com/photos/internetarchivebookimages/ [Drawing].

138. Ratzel, F, & Butler, A. (Artists). 1896. Polynesian Sea Chart. p 206 of "The history of mankind". [Drawing]. Retrieved September 16, 2014, from https://www.flickr.com/photos/internetarchivebookimages/.

139. Vogt. (Designer) 2009. Novartis Campus. [Digital Image]. Retrieved from http://www.vogt-la.com/en/projects/chronology.

140-141. Keane, B. (Photographer). 2001. Landscape as picture. [Photographs].

142. Keane, B. 2007. (Photograph). 2007. Walter de Maria, Lightning Field. [Photo].